

Running head: 1-FAMILY & 2-FAMILY HOMES

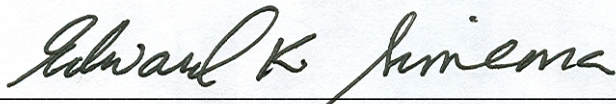
Would a mandatory residential fire sprinkler system
ordinance reduce fire damage, injury, and death in Honolulu?

Edward K. Simeona

Honolulu Fire Department

CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed: 
Edward K. Simeona

Abstract

For the City and County of Honolulu the problem was that property damage, injury, and loss of life from residential fires could not be reduced if the City did not adopt a 1 or 2-family residential automatic sprinkler system ordinance. The purpose for this descriptive research was to help prove through the use of statistical data, contractor's feedback, historical fire data, and literature review that if the City adopted a residential automatic sprinkler system ordinance property damage, injury, and death would reduce dramatically. The research was to answer the following questions:

- a) What were some of the major roadblocks for automatic residential sprinkler systems?
- b) What were some of the positive factors for automatic residential sprinkler systems?
- c) Has residential fire sprinkler technology really improved over the years?
- d) Could mandating a residential fire sprinkler system ordinance in the City and County of Honolulu decrease the number of injuries, fatalities, and dollar loss?

The research consisted of literature review of current statistics, data, industry information, and the departments NFIRS reports. Personal interviews with local building industry representatives, and City and County employees were held. Anecdotal situations were also reviewed. Results showed that although industry stats and data proved that fire sprinklers save lives, not enough information, incentives, and realized benefits were being recognized by the local homeowner. It was recommended that the department:

- a) Input the issue into the agency's Master Strategic Plan.
- b) Create an agency Task Force to network with the local homeowner.
- c) Have the Prevention Bureau continue support to the City Council and network with the local building industry.

- d) Have the agency clean up the NFIRS problems for better data gathering.
- e) Include the State Fire Council in the process so that all counties can work the insurance and tax incentive programs.

TABLE OF CONTENTS

| | |
|--|----|
| Certification Statement..... | 2 |
| Abstract..... | 3 |
| Table of Contents..... | 5 |
| Introduction..... | 6 |
| Background and Significance..... | 9 |
| Literature Review..... | 15 |
| Procedures..... | 29 |
| Results..... | 32 |
| Discussion..... | 36 |
| Recommendations..... | 41 |
| Reference List..... | 46 |
| Appendices | |
| Appendix A: City and County of Honolulu Ordinance No. 83-58..... | 51 |
| Appendix B: City and County of Honolulu Ordinance No. 01-53..... | 57 |
| Appendix C: HFD NFIRS Stats for calendar years 2003 - 2007..... | 65 |
| Appendix D: HFD Powers, Duties, and Functions..... | 70 |

Would a mandatory residential fire sprinkler
ordinance reduce fire damage, injury, and death in Honolulu?

Introduction

In 2003 the United States (U.S.) entered into the Iraq war. Since that time, the U.S. has committed over \$350 billion and has lost over 3,000 soldiers yet in comparison for that same time period, the U.S. spent well over \$750 billion in fire cost and more than 12,000 people lost their lives in residential fires (Mirkhah, 2007).

In 2003 the United States Fire Administration (USFA) convened a meeting where nationally recognized experts in the field of fire protection gathered to create significant strategies for the nation. One thing that they hoped to accomplish was to come up with an initiative which would spark interest in residential fire sprinkler systems mainly by the developers and builders, but hopefully by the homeowner as well. On April 9 and 10 in 2003 they met and came up with their policy statement, “The United States Fire Administration advocates the use of automatic fire sprinklers to save lives, reduce injuries, and protect property. Based on an identified history of success, this technology should be employed in all residential occupancies”. (Milke, 2003, pg 2) And what is so important about these strategies, the policy, and lastly the promised initiative? Three years later in Honolulu Hawaii during 2006, automatic sprinkler systems are not mandatory in new construction residential homes and that year there were a total of 821 residential structure fires of which 117 were incidents in 1 or 2-family residences totaling a dollar loss of \$7,984,278.00 in property damage. Occurring in that same time period were reported 16 civilian injuries and 6 fire personnel injuries resulting from those fires. A devastating statistic for this time period was the 3 civilian deaths occurring during those residential home fires. This compares to the figures gathered by the National Fire Protection

Association (NFPA) during 2006 where 396,000 home structure fires occurred across the U.S. which caused 2,580 civilian deaths, 12,500 civilian injuries, and \$6.8 billion in property damage (the U.S., n.d.). Now although comparisons are difficult to make between those two sets of facts and figures, the bottom line is that fire in a residential structure is destructive to everyone involved, neighbors, bystanders, the homeowner, and the emergency responders, and this is no matter where you come from.

In response to the November 1980 MGM Grand Hotel fire in Las Vegas, the City and County of Honolulu (CCOH) adopted an ordinance in 1983 making it mandatory for all new construction hotels to have automatic sprinkler systems installed and that previously built hotels were to be retrofitted with automatic sprinkler systems. This helped the Honolulu Fire Department (HFD) as it almost immediately began to realize minimal loss in damage, injury, and even death in high rise hotel fires.

The problem is that property damage, injury, and loss of life from residential fires will not be reduced if the city does not adopt a 1 or 2-family residential automatic sprinkler system ordinance. Legislation is the only means of helping the citizens to help themselves. Many myths surround the use of automatic sprinkler systems and some of the more common ones and the actual facts disputing them are:

Myth: Smoke detectors provide sufficient protection.

Fact: Smoke detectors only provide for an early warning system for the occupant. The loud alert assists in evacuation but does nothing to extinguish or contain a growing fire.

Myth: Fires sprinklers are ugly to look at.

Fact: Residential sprinkler systems can be attractive ceiling and side mount sprinkler heads that blend unobtrusively into your room decor. Sprinkler cover plates, and

escutcheons can be custom painted by the manufacturer to match any décor (merit sprinkler company Inc., n.d.).

Myth: The added cost of sprinklers will make housing unaffordable to the first time home buyer.

Fact: On average, sprinkler systems cost only about 1-2 percent on the total construction costs (residential sprinkler myths and facts, n.d.)

The homeowners here in Hawaii need to be educated with the facts that diminish the effect of the myths on their mind set. Without overcoming their fears, feelings, ideals, and understanding of the life saving sprinkler equipment it may never be installed in their homes. Everyone must be made aware that most fire-related deaths and injuries across the nation, including Hawaii, occur in the home and a very small percentage of the population have home sprinkler systems. The automatic sprinkler system is a very effective and efficient tool to use in the controlling of fires in any residence if installed and maintained properly. The automatic activation of a sprinkler system helps in keeping the effects of fire such as toxic smoke, heat, flames, and disorientation from overcoming an occupant. The sprinkler system is designed to save the occupants life by increasing the survival period and stopping the spread of fire and eventual flashover (Mirkhah, 2007).

The purpose for this research is to help prove through the use of statistical data, contractor's feedback, historical fire data, and literature review that if the City would adopt a residential automatic sprinkler system ordinance property damage, injury, and death would reduce dramatically. If statistics alone could be accepted by the homeowner community then bigger strides could be made towards pushing for legislation to mandate automatic sprinkler systems, however at the present time most homeowners are misguided because they do not have

all the facts. Lack of knowledge makes them opponents to any form of ordinance or legislation but enlightening them with facts and data could help them to become proponents instead.

The use of a descriptive research method will help in considering the following research questions:

- a) What are some of the major roadblocks presently keeping homeowners in the City and County of Honolulu from installing automatic sprinkler systems in their homes?
- b) What are some of the positive factors that would attract a homeowner to install an automatic sprinkler system in their home?
- c) Has residential fire sprinkler technology really improved over the years?
- d) Could mandating a residential fire sprinkler system ordinance in the City and County of Honolulu decrease the number of injuries, fatalities, and dollar loss resulting from residential fires?

Background and Significance

Honolulu, on the island of Oahu, is the capitol for the State of Hawaii and the CCOH is the main governmental body for the island of Oahu. Oahu is one of the 8 major islands in the Hawaiian chain making up the State of Hawaii. Governing the remaining islands are individually run City and County bodies identified as Kauai County, Maui County, and Hawaii County. Each county has its own fire service agency and Oahu has the HFD which protects and responds to, among other things, medical emergencies, water and mountain rescues, hazardous materials incidents, and all structure fires around the island of Oahu. Being the State Capitol and also having Pearl Harbor, Diamond Head and Waikiki beach, the island of Oahu is a main tourist destination for the State and thus may have up to a million tourists pass through this State Capitol during any given season. The hotels to house these tourists are many and strewn

throughout the entire island from Waikiki on the southern shore to Turtle Bay Hilton on the north shore. The City Ordinance no. 83-58 (Appendix A), passed City Council in 1982 and was signed into law in 1983 provided for the retrofit of automatic sprinkler systems in all existing hotels 75 feet above the highest grade and which contains dwelling and/or lodging units 50% or more of which are guest rooms. This was a huge step for the HFD where all existing hotels were now to come into compliance by retrofitting a fire suppression system within. Then in 2001 City Ordinance no. 01-53 (Appendix B) was enacted where the purpose was to address the fire safety requirements for existing business buildings and specified that an automatic sprinkler system shall be provided throughout the entire existing business building.

Now where there were ordinances to provide for the fire protection system in the hotels, and business high rises, the residential homes which are spread out throughout the 604 square miles making up this island have no such mandate put upon it. The single and multi-family residential dwellings, like the hotels, are spread out throughout the entire island. The 604 square miles covered by the HFD is divided into five geographical battalions for resource distribution however for fire response these boundaries have been further divided into urban, suburban, and rural designations. The urban designation covered the heavily developed areas of Oahu where the population density was at least 1,500 persons per square mile. The suburban area contained mixed occupancies moderately developed with a population density of between 500 to 1,500 persons per square mile. The rural area is the final designation where predominantly residential and agricultural lots spread out across wide open areas with low to moderate population densities (Wassman, 2005a).

Each battalion has a battalion commander as its manager and each commander is responsible for anywhere from 6-12 companies which are run by a company officer supervisor.

Each company has 5 personnel assigned to it and on any given day there will be approximately 350 personnel staffing all the apparatus in service. Although the entire island has its varied emergency response concerns, the biggest concern for each battalion commander is not the business or commercial property, not the high rise hotels, but it is the single and multi-family residential homes. Field operations consist of 44 fire stations, 1 aircraft hangar, and 1 fire boat station. The entire department houses 69 company apparatuses, 2 helicopters, and 1 fireboat. Geographical separation between stations drives the distribution of fire stations, its apparatus, and the capability of all the varied types of resources.

There are a number of variables governing structure fire suppression. In-house fire suppression protection, apparatus travel distance and response times, staffing, operational tactics, time of day and the geographical location of the fire department property itself. The goals of any fire agency in response to structure fires are to respond the proper resources to handle the job, minimize property damage, contain the spread of the fire, avoid but care for any injuries if found, and above all else save lives. The key component in any structure fire in a single family residence is the element of flashover. Flashover is defined as the moment of conflagration or complete incineration caused by superheated air or combustibles (flashover, n.d.). For any fire agency to be successful in accomplishing their goals as stated above, they must arrive on scene before flashover. Flashover is a very critical point in any conflagration because when flashover does occur, any person still in the room usually does not survive.

The HFD has gone through the accreditation process and raised all of its standards to mirror the accreditation standards created by the Commission on Fire Accreditation International (CFAI). One of the more important requirements governing the CFAI's process is the standard of response coverage requirement. Distribution is the term utilized by the CFAI to designate the

locations of the stations (Wassman, 2005b). The distances between fire stations are critically defined to ensure the rapid response of HFD resources anywhere around the island at any given time of the day. Travel distance is quite important when speaking about early arrival to a structure fire incident but staffing, knowledge, and experience all play important roles in the quick stopping and extinguishment of any fire. You must also consider early recognition and early intervention in the saving of lives as it is generally accepted within the industry that flashover normally occurs anywhere from 4 to 10 minutes after the smoldering and free burning phases of a fire occur. It is this very crucial time period between the smoldering stage of the fire and the flashover itself that the HFD has created its response time goals.

Structure Fire Response Time Goals:

- a) Urban communities: the first due shall arrive on scene within 7 minutes total response time, 80% of the time, and be capable to provide initial actions for fire fighting.
- b) Suburban communities: the first due shall arrive on scene within 9 minutes total response time, 80% of the time, and be able to provide initial actions for fire fighting.
- c) Rural communities: the first due shall arrive on scene within 11 minutes total response time, 80% of the time, and be able to provide initial actions for fire fighting (Wassman, 2005a).

The HFD's response times goals listed above ensures the quickest and most reliable response to any structure fire and although the times themselves are very acceptable within the industry, you must take in to consideration the fact that 20% of the time responses take longer than required and while 80% is a very respectable value in itself, it is still not 100% of the time. This is important to note due to the element of flashover as mentioned earlier. If flashover is

imminent within 4 to 10 minutes and the first on-scene HFD unit is arriving in 7 minutes 80% of the time that means that in cases of flashover occurring within the first 7 minutes any occupant still in the home will have no chance of surviving. According to James M. Shannon (2007) President of the NFPA, everyone should be safest in their own homes however when it comes to structure fires, their home is their worst enemy and the most dangerous place to be (Shannon, 2007). Shannon also points out that the fire fatalities have declined in the U.S. since the late 70's due in part to public education and better building codes requiring such measures as sprinkler systems (2007). Statistics for the current 5-year period in Honolulu shows an actual increase of fires resulting in more civilian injuries and deaths in that short time period. Could this increase reflect on the fact that no residential sprinkler system measures were ever passed in all of these years since 1970? Here is the injury and death data for the time period 2003 to 2007:

| Honolulu Fire Department (HFD) Statistics | | | | | |
|--|--------------------------------|-----------------------------|-------------------|-----------------|-----------------------|
| Year | Total Structure Fire Incidents | 1 & 2-family fire incidents | Civilian Injuries | Civilian Deaths | Fire Fighter Injuries |
| 2003 | 675 | 138 | 11 | 1 | 2 |
| 2004 | 627 | 140 | 11 | 9 | 3 |
| 2005 | 601 | 131 | 6 | 3 | 5 |
| 2006 | 821 | 117 | 16 | 3 | 6 |
| 2007 | 701 | 181 | 19 | 2 | 0 |
| Source: HFD NFIRS Data (Appendix C) | | | | | |

How then can property damage, injury, and death due to single family residential fires be minimized? The HFD can decrease their response times and arrive at scene sooner than they do now or the homeowner could possibly have an automatic fire sprinkler system installed in their home. The first option is a very long term and costly one which would need either the addition of more stations in identified areas to increase coverage and minimize travel distances or the fire

fighters could be encouraged to speed up their turnout times to lessen their overall response times which means a total revamping of the culture of the fire fighters themselves. The second is doable but will take a highly focused effort of providing education to the public to create a change in mindset that has driven them for many years now, and a coordinated effort between City, HFD, and the construction industry to come to an understanding and agreement. It must start with the providing of data or actual facts and figures on the cost estimates versus overall benefits of the automatic sprinkler systems. If the homeowner could compare the value of the product versus the cost of damage, injury, or death it would go a long way to help them in their efforts to understand the bigger picture. It means working together with the contractors and builders to provide support in helping their efforts at gaining legislation for trade-ups and alternatives for cost savings. And finally the overall reduction of negative impact on homes and families from fires can also be accomplished through legislation of a city ordinance making automatic residential sprinkler systems mandatory in new home construction. Can the ordinance help reduce or even eliminate dollar loss? The figures below show the increase in dollar value loss during residential fires during the time period 2003 to 2007:

| Honolulu Fire Department (HFD) Statistics | | | | | |
|--|----------------------------------|-----------------------------------|----------------|----------------|-------------------|
| Year | Total residential fire incidents | 1 & 2-family resulting in \$ loss | Bldg loss | Content loss | Total dollar loss |
| 2003 | 675 | 138 | \$5,226,820.00 | \$984,880.00 | \$6,211,700.00 |
| 2004 | 627 | 140 | \$6,037,165.00 | \$1,244,665.00 | \$7,281,830.00 |
| 2005 | 601 | 131 | \$5,864,250.00 | \$1,349,950.00 | \$7,214,200.00 |
| 2006 | 821 | 117 | \$6,768,850.00 | \$1,215,428.00 | \$7,984,278.00 |
| 2007 | 701 | 181 | \$8,590,835.00 | \$1,614,800.00 | \$10,205,635.00 |
| Source: HFD NFIRS Data (Appendix C) | | | | | |

The reason to create legislation through a City ordinance would be to help reduce injury, loss of life, property damage, and dollar loss. How does one go about this daunting task? In this case the first phase is to create a report such as this ARP, present it to the authority having jurisdiction through the HFD in the form of an community risk reduction initiative, then provide as much research and support as necessary to assist the City Council in getting this very important bill proposed and passed.

The chosen topic is relevant to the Leading Community Risk Reduction course in that if the ARP is properly proposed, submitted, and accepted by the HFD, it then becomes an initiative for the reduction of risk involving 1 and 2-family residential fires. Once the HFD gets behind the initiative and begins to push for the support of a city ordinance it will be able to provide strong support through research, planning, and testimony to the City Council themselves. This ordinance will provide for the reduction of property damage, injury to civilians and fire fighters, and the loss of life through the mandate for the inclusion of automatic fire sprinkler systems in all new residential home construction from that point forward.

The topic also supports 4 of the 5 USFA operational objectives. The reason to help initiate a mandatory single family residential sprinkler ordinance is that in the long run if a city ordinance is passed it is highly probable that it would lead to the reduction in the loss of life of all age groups from infants, to the very elderly, to the fire fighters responding, in the single and multi-family residential fires. It will also promote a risk reduction plan for the single family residential home owner led by the City Council but fully supported and championed by the HFD.

Literature Review

Throughout the fire industry, it is highly recognized that the most effective means of containing the spread of fire, and minimizing the toxic effects during the early stages of fire is

through the use of fire sprinklers. Yet even when that can be verified by exceptional data gathered by such respected agencies as the NFPA and the USFA, even till today many jurisdictions cannot get a mandatory ordinance passed for residential sprinkler systems including the CCOH. How can a homeowner possibly believe in this life saving device when even the leadership of the local government is not behind the idea? According to Wayne Nojiri (2003), retired Assistant Chief (AC) of operations for the HFD, during a personal interview with the administrative assistant to the Managing Director (MD) of the CCOH he was informed that the MD would deny the approval of a request by the HFD to mandate sprinkler systems in all residences (Nojiri, 2003). The MD's reason was that there were just too many unknown variables to consider. Would an increase to the cost of building a new home be acceptable to the new homeowner? This was a question the MD felt would have political fallout and one that he did not want to have any part of at this time. It was the MD's position that with this new technology there would be a need to increase the number of personnel who would be responsible to monitor and inspect those who would install, maintain, and repair the new systems. The increase to the City's budget due to the increase in inspection personnel was another issue too large to consider at that time (2003).

As pointed out in the beginning, the lack of knowledge and understanding is a very important hurdle to overcome when talking about residential fire sprinkler systems. Many Americans do not understand or agree with the push for residential sprinkler ordinances let alone those that live here in Hawaii and specifically on the island of Oahu. The islands are usually behind in the times compared to our mainland counterparts. The HFD monitors everything that goes on anywhere across the U.S. but by the time that information reaches the department it is already dated, then by the time the department is able to do anything about it months or even

years have gone by. The HFD monitors those other metropolitan agencies similar to itself like the San Francisco Fire Department, the Houston Fire Department, the Fire Department of New York, the Chicago Fire Department and others. What has been pretty clear is that residential fire sprinkler systems have only caught on in a few jurisdictions across the U.S. but more and more in today's world the information is getting out to the public as well as the industry and more is being done about it.

What makes the local population in Hawaii frown upon residential fire sprinklers when there is so much overwhelming data and information to prove the value of this life saving, property conserving equipment? How can anyone accept what is intangible? They only understand what they can see, touch, and what they can wrap their minds around with understanding. To the uneducated such statements as, "Smoke alarms will put the fire out!" is common place (residential sprinkler myths and facts, n.d.). Don't these people know that a smoke alarm has no water supply and thus no fire extinguishing capabilities? The smoke alarm is only to awaken the sleeping occupant to exit the structure, but what will be used to extinguish the fire? How about, "Water damage from a sprinkler system will be more extensive than fire damage". Will this lay person understand when presented with the fact that quick response fire sprinklers release 8 to 24 gallons of water per minute compared to the 50 to 125 gallons per minute released by a fire hose? Also, research has demonstrated that only 1 in 16 million heads ever activates by accident (residential sprinkler myths and facts, n.d.). The definition of "Word of Mouth" is the passing of information by verbal means, especially recommendations, but also general information, in an informal, person-to-person manner (word of mouth, n.d.). The many misconceptions or myths pointed out are usually shared via word of mouth between uninformed,

non-professional citizens which causes it to be built up or blown out of proportion, but more disturbingly, to be perpetuated.

The largest roadblock would have to be the overall cost of the installation. Bob Trotter (2005) of the National Fire Sprinkler Association (NFSA) points out that the average cost of residential sprinkler systems in Scottsdale Arizona cost less than \$.80 per square foot and in Goodyear Arizona that figure is \$.60 per square foot (Trotter, 2005). Don Pamplin (2007) the NFSA's Pacific Northwest regional manager says that there are many issues which keep sprinkler systems from being accepted, but the biggest issue is that of the falsely reported costs. In the Non-Oro Valley Arizona area where residential growth has taken off, says Pamplin, the average costs is between \$.80 and \$1.25 per square foot for new construction. Here in the Non-Oro Valley jurisdiction an average home valued at \$700,000 costs an additional \$4,000 for the installation of an automatic sprinkler system, or less than 1% of the total building cost (Pamplin, 2007). Now compare this to construction costs on Oahu. According to Sam Dannaway of Dannaway & Associates (personal communication, July 9, 2008) who is a fire protection systems engineer and owner of his own firm, the construction costs for Oahu would come out to roughly \$3 to \$4 per square foot. Sam also maintains that the local water servicing agency will charge anywhere from \$1000 to \$2000 additionally for an upgrade to larger water meters which would most likely be necessary depending on the actual water flow needs. Agreeing with Sam was Jim Stryker of Reliable Fire Protection Company (personal communication, July 9, 2008). Jim has seen some installations cost as much as \$7 per square foot due to the amount of sprinkler heads in the residence and the total water flow needed. Jim says that most contractors in Hawaii do not like to do single family home installations because it is not cost effective for their businesses. Presently, the amount of time and effort expended versus the amount of monies garnered for a

single family residential sprinkler install is more of a deterrent for any fire sprinkler business in Hawaii. This would be because compared to the commercial building fire sprinkler market, where the numbers really add up due to the local ordinance; the one-here one-there residential installs are not very profitable. Both Sam and Jim agree that most contractors would love to do fire sprinkler systems in a residential subdivision or new development where many single family homes were involved because now it would be worth their time and effort. They just don't see that happening too often at the present time or in the near future. Scott Baltic (2000) of the Fire Chief magazine writes, "The truth is that the sprinkler industry is heavily oriented towards the commercial/industrial installations, not residential, and that single-family residential represents at most a tiny fraction of the industry's business". (Baltic, 2000, pg. 6)

One of the reasons that the construction costs for these systems are so high here in Hawaii is that the contractor must be able to prove that they have special insurance and certifications for their installers before they can do any work, and those costs for insurance and certifications must be eventually passed on to the homeowner. At best, Jim Stryker does roughly 6-8 installations per year and Sam Dannaway has done up to 12 in one year but they both say that they, along with most of the contractors they know, find themselves doing residential installations mostly for personal friends or as favors to others in the industry and rarely do they make very much money off of the job. They say that no matter what they try and do the costs in Hawaii will usually come out about 15-20% higher than what the mainland homes are installed for because everything is shipped to Hawaii adding a heavier burden to the local materials and supplies costs. They have both done installations for fire fighters, whom they say understand the necessity and the benefits of the systems and also for the very affluent who don't have issues with systems costs and are only looking to protect their costly investments. Other than that,

without an ordinance for mandatory residential sprinkler installation they don't foresee much interest from very many others coming anytime soon.

There are positives which can be proven that automatic sprinkler systems are worth the time, effort, and costs. Scottsdale Arizona, during a 15-year study between 1986 and 2001 showed that there were just fewer than 600 residential home fires and out of that, 49 were in sprinklered homes. No deaths occurred in the sprinklered homes compared to 13 deaths in non-sprinklered homes. The average fire loss during that 15-year study of 49 fires was \$2,166 per sprinklered home. In contrast to that, the average fire loss in a non-sprinklered home during only a 3-year period spanning 1998 to 2001, where 86 fires occurred, was \$45,019. And finally the overall fire loss comparing Scottsdale with the rest of the nation showed that during the period 1996 to 2001 Scottsdale had a total fire loss of \$11,749,782 while the rest of the nation suffered a \$36,624,034 total loss or more than 3 times that of Scottsdale (municipal report, n.d.). In 1990 Prince George County, MD enacted their ordinance requiring that all new construction homes be sprinklered starting in January of 1992. In 2001 a report of the first 8 years of this new ordinance showed that a total of 117 fire incidences occurred in which fire sprinklers deployed. There was a total fire loss of \$401,220.00 for these 117 incidents as compared to the possible potential loss of \$38,230,000.00 had the sprinkler systems not been present. Chances of dying in a fire are minimized and the average property damage is cut by half and sometimes up to two-thirds in properties which are fully sprinklered (fire sprinkler facts, n.d.).

In certain jurisdictions incentives offer the best reasons for homeowners to consider fire sprinkler systems in their homes. What form of incentives work well in the industry and would they go over well here in Hawaii? In Montgomery County, MD homeowners who install

sprinkler systems in new construction homes or those who retrofit their older homes with new systems are eligible for up to a 50% one-time property tax credit (fire chief staff, 2003).

A new technology “multipurpose system” is now available on the market in the U.S. This new system utilizes the cold water piping system to supply both the domestic needs of the home and the fire sprinklers. Increasing the system reliability is one favorable reason for combining the systems as any problems within the system would show up immediately and be easily recognizable. With the multipurpose system it will no longer be necessary to install cross connecting devices, which in the past was mandatory to prevent contamination of the potable water supply in the city’s end coming from the sprinkler system in the homes. This new system however, will help in minimizing the contractor costs for installation of a check valve and/or a backflow prevention device by up to as much as \$500 dollars (Coughlin, 2001). By minimizing the contractors’ costs more attractive packages could be passed on to the homeowner making the installation an easier sell.

Another possible incentive comes about as the result of recent tests run in Los Angeles. As a result of those tests, the Insurance Services Office (ISO) Personal Lines Committee has made a recommendation that a 15% reduction in the homeowner’s policy premium be given for installation of an NFPA 13D residential sprinkler system (Madrzykowski & Fleming, 2002). Now although this would not be a huge immediate savings for the homeowner, the continuing increases in the cost of insuring a single-family home makes this an attractive incentive over the long run (2002).

If the State of Hawaii would use the State of Alaska as a model, it might find that the law enacted in 1981, which has had a dramatic impact on the installation of sprinkler systems throughout that state, could help in its attracting of the local homeowners here in Hawaii. In Alaska the law gives the homeowner a tax exemption of 2% of the assessed value of any structure protected with a fire sprinkler system (Madrzykowski & Fleming, 2002). In other words, if a home and property were

assessed at \$600,000 (median home prices in Honolulu) and the home portion represented \$485,000 then according to the exemption, the assessed value of the home would now be \$475,300 and the total property assessment would be \$590,300 for tax purposes.

Does the installation of fire sprinkler systems help increase the value of a home? The Home Fire Sprinkler Coalition (HFSC) in December 2005 commissioned a national survey where 1,019 adults (620 of whom own a home) spread out across the U.S. were surveyed in order to measure their awareness of residential fire sprinkler systems (new national survey, n.d.). During the survey it was found that 69% of those polled really believed that fire sprinklers in the home would help increase the value of their home. It was also found that 38% of these adults were more likely to buy a new home with a sprinkler system than one without it. Finally, 43% of those surveyed who said that if the cost of sprinklers could somehow be included in their mortgage, they would without a doubt opt for the sprinkler installation (new national survey, n.d.).

What may help for subdivision developments is the possibility of “trade-ups” for the developers. According to the HFSC, trade-up options for the developer may include such things as, increased density for the units, fire flow credits, hydrant placement or spacing, creative access requirements, street width reduction, increased street grades, building set backs, additional units, and the elimination of the need to increase water supply (trade-up, n.d.). Noted in the information given regarding these trade-ups was the fact that in Scottsdale, AZ, the average final costs for sprinkler systems in various developments there was less than \$200 per unit after taking into account the savings from the trade-ups. Some jurisdictions have also been known to offer building code alternatives to their developers, such as reducing the fire rated wallboard requirements, or reducing fire rating standards for masonry walls and doors (trade-up, n.d.). The bottom line to this action of trade-ups is that the overall cost to the developer is minimized and

the developers can then turn around and offer the installation and the homes at more reasonable rates.

What has occurred with the fire sprinkler technology in the years since its creation? Is there enough of a change and has technology moved forward enough to entice more homeowners to install systems in their homes? The industry has made huge strides since the early years and many new technological advances continue to improve the suppression systems but there were no hugely significant advancements even within the past 5 years.

An advancement which has helped to improve these systems was the addition of the multipurpose system. With this advancement two important speed bumps were being addressed. Overall costs and builders' resistance have hampered the industry for many years but the multipurpose systems which have technical, economic, and marketing advantages over stand-alone systems, are helping to smooth over these two speed bumps (Coughlin, 2001). Two revisions to the NFPA 13D standard are helping the multipurpose system become more inviting. Coughlin (2001) also shows that in 1999 the first revision to NFPA 13D to impact the multipurpose system was reducing the minimum working pressure of pipe from 175 psi to 130 psi. The other revision was reducing the pipe diameter from 1-inch down to ½ -inch. Those revisions helped the multipurpose system become popular for installations because now the issue of stagnant water in stand-alone sprinkler systems, which until now was considered a potential health threat, is no longer a concern (2001).

Back in the early 1890's black iron piping was being used during installation. It was soon replaced by steel piping. In the 1960's the industry went to copper tubing for fire sprinkler systems. The 1980's brought about the use of chlorinated polyvinyl chloride or CPVC and polybutylene or PB, and finally "light wall" steel piping. The entire lot of piping held different

material qualities and properties like its melting point, the linear expansion, and the weight per unit. The steel pipe is usually very firm and black in color. The copper tube is brown in color and more readily able to be shaped or formed. The CPVC is a bright orange color, lightweight and rigid thermoplastic pipe and was first used in a residential system in 1984. Finally the polybutylene or PB piping is a grey, lightweight, and highly flexible pipe which was first listed by the Underwriters Laboratory (UL) in 1985 (Notarianne & Jackson, 1994). Each different type of piping brings its own unique qualities to bear for a sprinkler system and installation costs will differ depending on the type of piping used. Consideration will be given to account for the amount of the materials and its accompanying joints and connectors, the labor necessary for each type of material of pipe, the ease of installation, and the cost per unit foot of pipe. Now while the costs may be significant regardless of which type of piping is used, and while each type of pipe has its own set of pros and cons and variable costs, the overall material costs are fairly similar regardless of which piping is used and all fall within 10% of each other (Notarianne & Jackson, 1994). So although system piping has changed with the material makeup, the total costs for parts and labor for the complete installation has not drastically changed to make the installation more acceptable.

While trying to address the question of whether an ordinance would help to decrease the number of injuries and/or fatalities resulting from residential fires one must look at what has occurred in other jurisdictions which already have adopted their local ordinances. Comparing the gathered data for fire loss in dollars, and civilian and fire fighter injuries and death will help in establishing the trends and tendencies, and then the data can be taken into account when trying to predict the probability of overall decrease in the total numbers here at the local level.

Retired State Fire Marshall Ronny Coleman (2007) says, “Over the last two decades the role of sprinklers in limiting fire loss has continually progressed from a hypothetical solution to a very realistic and practical one”. (Coleman, 2007, pg. 42) Take in to consideration what happened in his State of California’s Orange County jurisdiction where in 1999 buildings where sprinklers were installed showed an average property loss of \$1,721 compared to \$16,064 in non-sprinklered buildings. Also in San Clemente, CA, the average property loss was 60% less in sprinklered than in non-sprinklered buildings (staff, 2001).

In a home fire in Washington D.C., where a pot of oil was left on the stove and eventually caught fire while the occupant wasn’t home, the incipient stage fire was extinguished by a residential sprinkler system. The building owner was not mandated to install a sprinkler system but did anyway and as a result of his protective thinking, damage to the \$1.25 million dollar building was only \$50,000 and the loss to the occupants’ contents, valued at \$15,000 was only \$2,000 (Tremblay, 2004).

Fire fighters in Missouri responded to what they thought was a house fire caused by an oil lamp. What they found upon entering the residence was really a working methamphetamine lab. Unfortunately for the homeowner, no sprinkler system was present in the home and the lab fire damaged the \$70,000 house to the tune of \$45,000, and the contents valued at \$35,000 had an estimated \$20,000 loss (Tremblay, 2004).

In Anne Arundel County, MD Michael Cox Jr. (2006) writes that the result of a statewide survey of the Maryland fire departments where there existed a local residential sprinkler ordinance revealed that 62% of those survey provided documentation to prove that their particular areas had reductions in their annual fire loss statistics primarily because of their local ordinances (Cox, 2006).

In Prince George County, MD a 12-year study of the data was made for homes with installed sprinkler systems and then those numbers were used to estimate what that loss would have been had the home not been sprinklered. Damage in the sprinklered homes came out to just under \$3,500 per fire incident and they estimated that potentially the loss could have been approximately \$326,752 per incident had those homes not been sprinklered (Brown, 2005). Fire Chief Ronald Siarnicki (2001) of the Prince George's County Fire/EMS Department provides further data in his EFO paper of January 2001. Chief Siarnicki showed that from 1992 through 1999 in his county there were a total of 117 fire incidents where the sprinkler system was activated and out of those incidents the total fire loss amounted to \$401,220 dollars where the potential for loss was upwards of \$38 million. Also 157 potential victims' lives were saved during those fires with sprinkler activation (Siarnicki, 2001). In 1985 statistics showed that in Prince George County an average of 12 residential fire deaths, 104 fire related injuries, and fire losses in excess of \$13 million were occurring annually, but fortunately all of this changed in 1992 when the mandatory sprinkler system ordinance took effect (2001).

And of course the most utilized and scrutinized data comes from the Scottsdale, Arizona study. Hayden Brown (2005) provides some data from the 15-year study put out by the Scottsdale, Arizona jurisdiction in which the average property loss due to fire in a home installed with a sprinkler during that time was \$2,166 compared to \$45,019 in those without sprinkler systems (Brown, 2005). Assistant Chief Jim Ford (1997) of Scottsdale, Arizona provides further data from his authored 10-year study proving that from 1985 through 1996 their City experienced 598 fire incidents in residential structures. Of these 598 eighteen were in 1-family type homes and 26 were in multi-family homes where the sprinkler systems deployed. Of these 44 incidents where sprinkler activation occurred, 41 were either controlled or contained the fire

with only 1 to 2 heads activating. The eighteen 1-family homes involved had an average fire loss of \$1,689 and a total loss of \$30,400 where the potential for possible loss came out to \$5,393,000. The most significant stat in this report was the fact that 1 family members' life was saved due to the sprinkler deployment (Ford, 1997).

The resulting information coming out of this literature review while providing information, guidance, and intriguing statistical data does not appear to be anything earth shattering which would move the local population to a new direction of thinking. Pointing out earlier that knowledge and understanding is important for the local homeowners, and providing statistical data to help them to grasp the concept of fire sprinkler systems doesn't appear to have been a strong enough motivator to overcome their fears of the total costs up to this point in time.

While the review helped to show some of the hurdles and roadblocks encountered by the industry the major obstacle comes from the builders and contractors as the residential fire sprinkler systems are just not a cost effective business for them so they lobby hard against any form of law, bill, or ordinance for residential systems. Since the builders and contractors have strong lobbyists like the National Association of Home Builders (NAHB), the local homeowners have no advocates. Bob Trotter (2005) of NFSA points out that the NAHB published this quote on their website, "The NAHB supports the installation of hard-wired smoke alarms in all homes, new and existing, as a cost-effective provision for protecting occupants of homes from fire death and injury". (Trotter, 2005, pg. 44) Trotter goes on to say that the Home Builders Association of Central, AZ which is affiliated with the NAHB led the creation of a political action committee to put together a petition of signatures to promote a public referendum to repeal the newly adopted ordinances in Avondale and Goodyear, AZ (2005). With the power of a national association putting out statements such as these, how can the lay-person contest what they read?

If the City government of Honolulu cannot fully get behind the idea itself, how can the lone homeowner find value in this life saving equipment? The Managing Director cannot be convinced, but is a political view point a true indicator to follow for a homeowner?

What was also found in the review was the fact that many myths are abundant in the industry so how does anyone bordering on the idea of installation find the correct facts let alone accept these true facts once they find them, when all that is available for these homeowners is word of mouth information or bad information which usually is taken for its face value and not researched for any supporting evidence.

Since the homeowner may have to weigh the cost versus benefit of a sprinkler system to their family and financial situations, can the minimal number of positive factors in the industry sway the homeowner? Not many positive factors, besides the statistical data, will provide cost savings opportunities for the homeowner. They understand hard cold cash versus intangible data, information, or even options for a system installation.

Technology explained throughout the literature review again was not overwhelmingly dynamic to help direct homeowners to the benefits of a fire sprinkler system in their homes. Some technological advancements help the systems themselves to get better in what they do and what they can offer, but is it just too little and too late?

Value can be grasped by the lay person in fire loss, injury, and death data but to enhance the picture to make it truly some valuable information to them, more of those stats and especially those in their own jurisdictions would be needed to make any kind of immediate impact on their mindset.

Procedures

In 1997 a residential structure fire in urban Honolulu resulted in seven fatalities. All were members of one family and ranged in age from 4 to 53. The bottom line to this tragedy was the fact that escape from the home was impossible, as the speed of which the fire ran through the older home was extremely quick and needless to say the fire was devastating to that father left alone after it. This caused a lot of talk regarding residential fire sprinklers amongst the HFD's personnel, especially those who responded to the incident. The issue was brought back to the forefront again in a recent residential fire in 2007 where 33 members of a large and extended family were caught in a 1-family residential structure fire caused by a 4 year old playing with matches. The youngster did not survive but again the speed of which the flames went through the home made it impossible for any of the family members at home to locate or to rescue the toddler and the outcome was extremely devastating to the remaining 32 members who were in an instant made homeless.

The need to find a community risk reduction initiative was made easy by remembering the two fatal fires and the 10-year span in-between where other fatalities, destruction, injury and loss resulted from residential fires where no sprinkler systems were installed. In 2003 retired AC Wayne Nojiri (2003) interviewed the then fire investigator for the HFD and was told that he, the investigator, had never investigated a residential fire where a sprinkler system had been installed or deployed (Nojiri, 2003). Captain Terio Bumanglag who is the present fire investigator who replaced the retired investigator of 2003 says that even in the past 5 years since the retirement of that investigator he himself has not been to any fires in any homes where there were sprinkler systems installed much less deployed (personal communication, July 20, 2008).

In this research, literature review played a major role in answering the reports questions and keeping on track to validate or challenge the reports purpose. Review was made through fire service magazine articles as well as opinions gained from industry proponent websites like the USFA, the NFPA, the NFSA, the National Institute of Standards and Technology (NIST), the National Association of State Fire Marshals (NASFM), and the HFSC. Literature was also gathered from the National Fire Academy's (NFA) learning resource center in the form of EFO applied research project papers, from the HFD's NFIRS fire reports, and from the CCOH documents and websites.

Besides the written material reviews, personal interviews were held either by phone or in person with employees of the CCOH, private building contractors, commercial engineering employees, and HFD personnel. The data and interview comments were utilized to make an analysis of the pros and cons of the issue at hand and to make a determination as to the viability of taking the issue higher not only into the HFD hierarchy but to the CCOH administration to champion the cause of residential fire sprinkler ordinance creation and adoption. The interviewees were chosen for their job responsibilities, their personal understanding of the issues regarding fire sprinklers, their ability to extract data relating to the issues, and their ease of being contacted. The phone calls were made during normal business hours to the place of business in the case of the contractors, engineers, and City employees but the HFD employees were done in person either in their place of work or in the administration building. The interview questions were created to answer the specific research questions or to clarify issues and concerns brought about by the literature review. This interview method was chosen because of the direct contact possibilities and the timeliness of the information being gathered. Being in close proximity of those chosen made the research much easier to accomplish.

During the research phase it was quite surprising to find a limitation still plaguing the HFD. AC Nojiri (2003) stated that during his research for his 2003 ARP, he encountered a major problem with reliable and valid data because the HFD had changed their computer system and had no data prior to 2000 (Nojiri, 2003). What was encountered during the present research for this report was the fact that the NFIRS reporting system was now strongly in place and retrieving data was very easy post 2000 and forward until present. The surprising limitation encountered was that the old adage, “garbage in, garbage out” used to emphasize that to extract good data, good data has to be fed into the system. Michael Ito (personal interview, May 15, 2008) the management analyst for the HFD was hesitant when asked to provide some of the data specified for this research because the NFIRS system being used by the HFD, in his opinion, still revealed short comings. Those short comings were due to the fact that all structure fire reports did not have an automatic launch for a fire suppression equipment tab where the person filling in the report would note any use of certain forms of fire suppression equipment such as fire sprinkler systems. Yes there was such a section to fill in but it was not a mandatory field which meant that if the person did not fill out the proper check boxes important information such as sprinkler deployment may never be acknowledged. So here in lays the problem. If the company officer knew the proper way to fill in a fire report the information would be put into the database and would be able to be extracted at a later date, however if that information was not inputted by the company officer due to his or her inattention, their limited knowledge, or just due to their carelessness then the valuable sprinkler deployment information would not be inputted and therefore not be able to be retrieved at a later date and time. What Michael Ito was alluding to was that due to the sheer numbers of the NFIRS reports in the HFD system there was no way of completely verifying that every single residential fire report had been filled correctly for that tab

and although his guess was to a probability of about 95 to 98% certainty that the information was current and accurate, he could not say for sure that it was 100% accurate.

Besides that HFD limitation, it was also found that actual statistics and data regarding current jurisdictions with ordinances in place were few and far in-between and finding those via the literature research was difficult. The conscious decision not to “cold call” any of the identified smaller jurisdictions to request validated statistics was due to the limited time frame and the concern regarding the impact of the results found.

Results

Greg Jakubowski (2005) says that sprinkler systems keep the fire under control which reduces the fire services risk when finishing the job, and it also minimizes the amount of resources needed at the scene to extinguish the blaze (Jakubowski, 2005). He further points out that if sprinklers were in more homes, the home owners wouldn't die during a home fire, and the fire service personnel would not die responding to or searching inside of these homes (2005). The first question asked in this research was, “What are some of the major roadblocks presently keeping homeowners in the City and County of Honolulu from installing automatic sprinkler systems in their homes?”. How can homeowners read statements like that one above from G. Jakubowski and still have reservations about the home systems? One point found during the literature review showed that a government official was lobbying against the suppression system. That would help put a negative spin on it for those who are unsure and yet his statement would be a validation for those totally against it. It takes the following steps for a proposed Bill to become a City Ordinance but with a dissenting MD how can the process work?

- a) City departments or the Council will draft a bill.
- b) The bill will then be placed on the “Order of the Day” for 1st reading.

- c) After the 1st reading, the bill is referred to the proper committee for review or amendment. The approved bill will then returned for public hearing and 2nd reading.
- d) A public hearing is held when required by law or when deemed necessary by Council. Bills usually pass 2nd reading concurrently with public hearing.
- e) Bills are then published in the daily newspaper if passed on 2nd reading.
- f) After 2nd reading and public hearing the bill is sent back to the committees for further review and amendment.
- g) If approved by committee, bills are sent back to Council for 3rd reading.
- h) After 3rd reading the bill is sent forward to the Mayor for approval or disapproval.
- i) The Mayor then has 10 days to review. If signed by the Mayor it immediately becomes an Ordinance. If the Mayor does not return it disapproved in the 10 days, the Bill takes effect as if the Mayor had signed it. If enacted, the Ordinance will be published in the local newspaper.
- j) If the Mayor disapproves then he or she must specify the objections in writing and return the bill within 10 days to the Council. The Council may, within 5 – 30 days override the Mayor's veto by 6 affirmative votes (ordinances, n.d.).

The review showed where trends and thoughts and actions were usually dated here in Hawaii compared to those agencies and states on the mainland similar in structure to our islands and even though some mainland jurisdictions have a sprinkler ordinance, the majority of the information supplied to our lay person homeowners comes to the islands after running through the mainland counties. Many times the information reaching the island homeowners is dated and filled with myth and misinformation. Myths versus facts were discussed at this point to show

how misinformation can cause more problems than is necessary. This problem is not only limited to Hawaii as the information gathered from the industry websites pointed out.

What was found during this research was the fact that the overall cost of the installation is what makes most homeowners balk at the prospect of being mandated to install fire sprinkler systems. Comparing dollar figures from the mainland installations and those same cost items provided by local contractors, engineers, and builders showed the large separation in costs between the mainland and the islands. Personal interviews by phone with Dannaway and Stryker provided feedback regarding the high costs to local homeowners and the Scottsdale and Prince George County reports provided the comparisons.

Larry Davis (2003) says that the one of the recommendations coming out of the America Burning report asked for the support of necessary technology for the sprinkler systems which would help Americans be more accepting of these systems in all types of homes (Davis, 2003). The second question posed in this research was, “What are some of the positive factors that would attract a homeowner to install an automatic sprinkler system in their homes?”. The biggest positive found was in the literature review where statistics and data were again gathered from Scottsdale and the Prince George County’s reports proving the reduction in injuries, death, and damage. The literature also provided statistics, anecdotal instances, and actual fire incidents where situations and their outcomes were predicated on fire sprinkler systems. Historical data starting in the 1980’s proved that fire sprinkler systems were successful, and it also showed some of the improvements in overall construction costs over the years.

Insurance and tax incentives, minimal new technology, components for variances, special considerations, and enticements for contractors and builders, and finally the increase in home value all came out during this literature and interview research.

In trying to answer question 3, “Has residential fire sprinkler technology really improved over the years?”, it was found very difficult to come up with many technological breakthroughs in the past few years. The technology and the benefits have changed and have improved a lot since the creation of this resource however; besides the actual addition to the NFPA Code itself from NFPA 13 to NFPA 13D not much has happened to sprinkler technology to make it more appealing to the homeowner who may be confused about the equipment. During the literature review the only significant changes to sprinkler technology found was the acceptance of the multipurpose piping system, the change in requirements for certain types and material make up of pipes, and the ability of the sprinkler systems used in today’s market to keep up with its ability to extinguish the new forms of upholstery materials and home furnishings.

The final question, “Could mandating an residential sprinkler system ordinance in the City and County of Honolulu decrease the number of injuries, fatalities, and dollar loss resulting from residential fires?”, was found to be more of a hypothetical question as on a local level there is not any data to validate an answer. The data from other jurisdictions, found through the literature review is the only means of predicting any type of change in the statistics for the CCOH. Using the data gathered, even in its limited capacity showed a significant improvement in the dollars loss, the civilian and fire fighter injuries and deaths for mainland jurisdictions. Review of this data and statistics were found to be the only means of relaying the possible potential of decrease in the local injuries, deaths, and fire loss here on the island of Oahu for the CCOH. With further and deeper research in a wider variety of jurisdictions around the U.S., it was concluded that more statistics and data could be gathered and a greater impact could be made with not only the local homeowners but also the HFD and the City management in regards to making the installation and the use fire sprinkler systems a lot more attractive.

Discussion

Michael Cox (2006) relayed information he gathered during a survey in his home State of Maryland where 145 departments were surveyed. Out of the 145 surveyed, 21 counties had sprinkler ordinances and out of those, 18 pointed to occupant and fire fighter safety as the number one benefit of having an ordinance in place (Cox, 2006). In the City of Nashua in southern NH, Investigator Wood (2004) says that fire deaths have occurred in the 1-family and 2-family residences, which in his county at the time of his EFO report still exempted those types of dwellings from any local ordinance (Wood, 2004). In the Sprinkler Age article of August 2001 the staff writer acknowledged that in Orange County Fire Authority in CA, fire sprinklers were effective in controlling and extinguishing fires in their early stages thereby limiting property loss, and loss of life (staff, 2001).

Time and again throughout the research it was found that residential fires in 1-family and 2-family homes across the U.S. loss from property damage was high, and civilian and fire fighter injuries and deaths were extreme. The CCOH was no exception to this finding and one of the intents of this research was to find out if a city ordinance could help in reducing these tragedies. Since the research showed that the fire sprinkler in residential homes issue was a national as well as a local problem, an objective for this report was to compare these problems, look at the solutions used to overcome the hurdles and roadblocks on the mainland, then make proposals for solutions at the local level here in the CCOH.

In the CCOH government, the department head such as the Fire Chief, cannot approach the City Council to provide testimony, information, or to propose a bill if not allowed by the City MD (Nojiri, 2003). If the MD feels that the increased costs to the homeowner has too many variables which makes it a very unpopular political decision, how can the fire agency move

forward with its intended recommendation for a fire sprinkler ordinance. As provided earlier, for a bill to be introduced it must be proposed by Council or by a department but if the department head as in the case of the HFD, cannot do that then the options become very limited at best. In Anne Arundel County, the initiatives of 1994 and 2005 both failed and Mike Cox (2006) says that a lack of political support was the main reason for the failures (Cox, 2006).

R. Wood (2004) of Nashua, NH found that 40% of the contractors in his county believe that the residential sprinklers add unnecessary costs and delay to the construction of homes there (Wood, 2004). The NAHB puts up some strong opposition to residential fire sprinklers and instead, says Bob Trotter (2005), supports the installation of hard-wired smoke alarms in all homes as a good protector of occupants from fire injury and death (Trotter, 2005). The local contractors on Oahu are a close knit society and through Sam Dannaway and Jim Stryker it was learned that many of the local contractors do not support the 1-family and 2-family sprinkler installations because it is not a cost effective avenue unless it is done for an entire subdivision. According to the HFSC, with trade-ups not only will it increase fire safety, control municipal operating expenses, and lower construction costs, but also it will be a win-win situation for the developer, the builder, and the buyer or owner/occupant.

You only have to view the proponent websites such as the USFA, the NFSA, the NFPA, the HFSC, the American Fire Sprinkler Association (AFSA), as well as others to find literature on the many myths surrounding the sprinkler technology and the industry itself. Why is it necessary to provide this myth vs. fact type of information? It is because the homeowner needs to get the correct information and facts so that they will be able to make an educated and informed decision. Being that there are so many misconceptions regarding fire sprinklers, and since these misconceptions are in many cases perpetuated through ignorance, someone or some

venue needs to be responsible to provide the absolute truths about this misunderstood resource. It is always difficult for the people of the State of Hawaii to keep up with what is new across the U.S. and especially in real time so because that does happen the uninformed will be kept in the dark and not be able to make their decisions based on hard facts and current knowledge.

Bob Trotter (2005) showed via statistics from the 10-year Scottsdale study report that although Scottsdale had a 54% increase in population during that period, the fire loss was less than ½ of the national average. There were no deaths during the study period although they had 49 fires in 1-family residences that had sprinkler systems installed while there were 13 deaths in homes where no sprinklers were installed. Finally, the average loss per incident of fire in sprinklered homes was \$2166 while in homes without sprinklers that figure rose to a little over \$45,000 per incident (Trotter, 2005). While there must be more data and stats to utilize, those researched and provided herein show a large gap between sprinklered and non-sprinklered residential homes and anytime you can use reliable data and statistics to validate a claim or conjecture it gives more strength to the intended direction or path the audience is being asked to follow.

The limitation found in the HFD NFIRS reports is a point of interest that was quite eye opening. What kind of strength can a proposal have when the data and statistics provided cannot be trusted due to it being suspect for accuracy and completeness? Since the HFD's call volume runs at about 35,000 to 45,000 calls per year, can those historical reports be reviewed for accuracy in a timely manner to be able to assist in the creation of a proposed initiative and even if it could would the resulting information still be acceptable as fact?

Fatalities have declined in the U.S. since the late 1970's and according to J. Shannon (2007) that is due to public education initiatives, improved building codes, and certain safety

measures such as the fire sprinkler system (Shannon, 2007). The HFD has a very comprehensive Fire Prevention Bureau (FPB) which does investigations, building inspections, community relations, codes and plans review, and public education however currently it does not provide any form of public education involving residential sprinkler systems because there is no need since the CCOH does not have any mandates for sprinkler systems. The battalion chief (BC) of this bureau is responsible to track and provide input and feedback to the fire chief regarding anything to do with the building codes and the fire codes. Socrates Bratakos who is the BC responsible for the FPB stated to me in a face-to-face meeting (personal communications, August 5, 2008) that presently the State of Hawaii is in the process of updating the local building code to the International Building Code (IBC) 2006. The state is also processing the adoption of the 2006 NFPA 1 standard with state amendments as its State Fire Code. Chief Bratakos is looking at attending the upcoming International Code Council (ICC) conference next month in Minneapolis, MN as the HFD representative where he says the participants will be voting on whether or not to mandate sprinklers in 1 and 2-family residences. The ICC develops the IBC and the International Residential Code (IRC) two vehicles which could help change the course of the residential sprinkler systems in the near future if the voting goes the way of the proponents and not the opponents.

In order to make a bigger impact on the local homeowners here on Oahu and in Hawaii for that matter, more information will need to be provided them and it must be current, accurate, and substantial enough to open their eyes to the benefits of this life saving resource. Throughout this research the only strength to any argument in favor of residential fire sprinkler systems was the statistics found nationally. No earth shattering positive factors or new technology can be found to overwhelm a homeowner who is against this improvement not only to their property but

to their safety as well. The strength of the building industry and the local contractors and builders have an advantage over the proponents as they have the strength of lobbyists at places like the NFPA and ICC conferences where their numbers increase their chances of being successful in voting down any proposal to NFPA and building code changes which support residential sprinkler systems. Looking from the outside it appears that the homeowner is accepting the feedback the building industry provides them and without contradictory evidence the homeowner cannot make a conscious decision in opposition to the info given by the builders.

Paradigm is defined as an example; a model; a pattern (paradigm, n.d.). If the local culture has such an ingrained paradigm, how then do you get them to change their understanding and be open to a new thought and direction? We must first start with ourselves says A. Mirkhah (2007). The fire service should whole heartedly believe in the value of the sprinkler systems before we preach to others and promote its capabilities. We must as an industry tout the benefits of this systems ability to save lives by presenting facts on how it increases the window of survival and avoids the lethal flashover. The fire service must get the lay person to understand that the interior environment would be safer for them during their escape and it also is a much safer environment for the emergency responders during search and rescue operations and eventual extinguishment (Mirkhah, 2007). But to do this the fire service must absolutely believe in the capability them selves so that when they preach about it, those who are listening will feel and understand their passion and believe it enough to make a difference in their outlook. For the State of Hawaii this will be its biggest challenge.

It has been established through data and statistics gathered across the U.S. from organizations and counties that currently require fire sprinkler systems in single family residences, that when installed and operating properly the systems save lives, minimizes injuries,

and cuts fire losses in residential structure fires. When considering all of the comparisons provided during the research it is very difficult not to agree that regardless of where fire sprinklers are mandated for 1 and 2-family residential properties; injuries, deaths, and property loss will decrease over time. There is no reason to believe that this will not be that same way here on Oahu in the CCOH. With reduced fires comes the reduced need for fire service response which lessens the opportunities for fire service injury or death during apparatus response and fire service injuries and death during interior fire operations. Now while some feel that reduced response could also mean the reduced need for staffing, the HFD still provides other very important services for the public (Appendix D) so organizationally, having a city ordinance for residential sprinkler systems will go a long way in the reduction of fire losses but not necessarily reduce the need for fire personnel. If the CCOH could be successful in getting an ordinance requiring new residential construction installation of fire sprinkler systems in 1 and 2-family homes, then the HFD could possibly be the beneficiary along with the local homeowner.

Recommendations

Throughout the research the prevailing point found was that fire sprinklers can save lives. NFPA, USFA, NFSA, HFSC, as well as others all agree that along with the installation of smoke detectors, the addition of the fire sprinkler system would greatly increase the chances of the occupant to exit the burning residence much more than just having the smoke detector alone.

The CCOH saw the necessity of passing an ordinance for hotel high rise and commercial business high rise structures yet it still cannot to this day, do the same for the 1, 2, and multi-family homes. Gathered from the research were options and ideas which could be used by the agency to help the homeowner better understand and accept the fire sprinkler system as a “must have” when considering the family needs and safety when building a new home. The big picture

is that everyone's efforts much culminate in a fire sprinkler initiative which would pass all readings and be signed by the Mayor after which time it would become the next fire sprinkler ordinance but this time for the residential single and multi-family homes.

In 2006 the HFD welcomed a new fire chief. The new fire chief provided the organization with a 5 year "Master Strategic Plan" (MSP) which he said would help guide his new administration in governing the department and at the same time give the members a roadmap of where they were going in their near future. This MSP identifies the timelines, those responsible, and the estimated investment necessary for completion. The first recommendation would be that the HFD administration take a good hard look at placing the issue of championing the fire sprinkler initiative on this MSP and as divided in the MSP, divide the issue into short, medium, and long range terms. Responsible parties can be identified, benchmarks and timelines can be established, and the amount of investment can be determined and monitored. By creating terms for this issue, measurements can be monitored and adjusted when and where it is needed. By making it an internal issue, the personnel of the agency can be made to understand the issue and the departments' position on the issue and efforts could be taken to totally familiarize the members with the agency's stance and create total buy-in from the ground troops. They put their lives on the line each time they respond on their apparatus to a residential structure fire and then when they actually have to enter into the burning structure to complete their operations. If the troops have the buy-in, that focus will come across to the public when they are out doing their residential and commercial inspections. And as the plan is continually being shaped and massaged, it would give the residential sprinkler issue a chance to change and grow along with it. By including the issue in the MSP, it provides a venue to get the issue in front of the MD and the Mayor as well. The MSP goes before the City Administration each year as the fire chief submits

this document along with the agency's budget for review and comment from the Mayor's office. The MD and the Mayor would have to address the issue on a formal basis after this.

The second recommendation is for the HFD to consider creating an internal task force whose sole responsibility it would be to gather information and data and evaluate the local homeowners' issues, concerns, misunderstandings, and current knowledge of the residential sprinkler system. This HFD task force could analyze where the homeowners stood on the issue and they could create the opportunities to go out into the communities and provide information at the grass roots level in the community forums now in place. The task force could take on the responsibility of educating the public through programs where live demonstrations could be given and a question and answer session could be done for the benefit of those still not totally convinced. The bottom line for this task force would be to flood the local homeowners with as much knowledge through data, statistics, demonstrations, direct one-on-one contact, as is possible and to gain their trust, respect, and buy-in for the issue so that they could not only make educated decisions but decisions that are good for them and their family's future health and safety. The task force should also take on the responsibility of identifying the local stakeholders who have the power and the numbers to cause not only a slow down but also a total shutdown on the issue because of lack of understanding of the issue. The identified stakeholders could then be grouped and the groups given to portions of the task force identified to shadow the groups and provide whatever is needed in the way of knowledge and understanding.

The third recommendation would be to have the FPB continue its responsibility of giving testimony to the City Council but this time have one or more members responsible to champion the fire sprinkler issue for the agency. There are many opportunities at this time to provide research, data, information, and support to the needs of the City Council to get them on board the

issue. Since the FPB also has contact with the building industry they could take on the responsibility of making contact with the contractors, builders, engineers etc. and evaluate what needs to be done to help the issue within that industry.

A fourth recommendation would be to have the Research and Development Assistant Chief work towards cleaning up the NFIRS data collection methods done by the field personnel. The help would be in the ability to gather and input clean and usable data for the NFIRS. Identified problems with the NFIRS system could be fixed and training to increase the knowledge and ability of the company commanders with their report writing would help the overall situation tremendously by providing good comparisons and stats for the local population.

The State has what is called the State Fire Council made up of all the fire chiefs of each county. Another recommendation would be to have this body do its own lobbying within the insurance industry and the local and federal governments to get insurance and tax incentive breaks for the inclusion of fire sprinkler systems in 1 and 2-family residences. The homeowner must see actual monetary savings to be able to accept the need for the sprinkler system because without it the homeowner has only intangibles and stories of what may or may not happen to them and their loved ones. “It can’t happen to me” is another adage where everyone believes that it will happen to others but not themselves. If the homeowner looks at cost versus the benefit, unless the costs are reasonable and affordable, they will take their chances because, “It just can’t happen to me”!

The HFD must recognize its role in this issue otherwise no one else will step forward to help the local homeowner. The State Fire Council must step forward for the state and together the fire chiefs can be unified in their efforts. If objectives could be immediately created by the HFD and the State Fire Council then a plan could be put forth for all parties to adhere to for the

betterment of all here at the local level and at the state level. These objectives should be specific, measurable, attainable, realistic, and time bound, or “SMART” for without being smart they probably will not be successful. The success can only be measured in the reduction of all losses be it property damage, injury, or even death after an ordinance has been created and enacted.

Would a mandatory residential fire sprinkler ordinance reduce fire damage, injury, and death in Honolulu? The road to change and acceptance will be long and difficult, but all the data, statistics, and research say yes it would.

References

- Baltic, S. (2000, December). Half a loaf is better than none. *Fire Chief Magazine*, 6.
- Brown, H. (2005, December). Economic analysis of residential fire sprinkler systems. *National Institute of Standards and Technology* (7277, pp. 1-67). U.S. Department of Commerce.
- Coleman, R. J. (2007, March). Open letter to City Councils, governors, and all other elected representatives of the people. *Sprinkler Age*, 26(3), 42-46.
- Coughlin, P. (2001, June). Your next sprinkler system. *Fire Chief Magazine*. Retrieved July 15, 2008, from Fire Chief.com website:
http://firechief.com/suppression/tactics/firefighting_next_sprinkler_system/index.html
- Cox Jr., M.E. (2006, October). A case for residential sprinklers for single family dwellings in Anne Arundel County, Maryland. Leading community risk reduction. Emmitsburg, MD: National Emergency Training Center's (NETC) Learning Resource Center (LRC).
- Davis, L. (2003, May). First responders: Residential sprinklers can douse fires long before rescuers arrive on scene. *Fire Rescue*, 21(5), 101-104.
- fire chief staff. (2003, October). Maryland county law mandates sprinkler systems in single-family homes. *Fire Chief Magazine*. Retrieved July 11, 2008, from Fire Chief.com website:
http://firechief.com/awareness/firefighting_maryland_county_law/index.html

- fire sprinkler facts. (n.d.). Fire Sprinkler Facts. In Home fire sprinkler coalition (Fire Service). Retrieved July 11, 2008, from Home Fire Sprinkler Coalition website: <http://www.homefiresprinkler.org/FS/FSFacts3.html>
- flashover. (n.d.). Dictionary.com Unabridged (v.1.1.1). Retrieved June 20, 2008, from Dictionary.com website: <http://dictionary.reference.com/browse/flashover>
- Ford, J. (1997). Automatic sprinklers a 10 year study. (pp. 1-98). Commonwealth of Massachusetts: Home Fire Sprinkler Coalition
- Jakubowski, G. (2005, May). Here's your chance: Vote to require sprinklers in new homes at June NFPA conference. Wild land firefighter Magazine, 9(5), 6.
- Madrzykowski, D., & Fleming, R. P. (2002, January). Review of residential sprinkler systems: Research and standards. *NSTIR 6941*. Washington D.C.: U.S. Department of Commerce / Federal Emergency Management Agency.
- merit sprinkler company Inc. (n.d.). *Merit Sprinkler.com*. Retrieved May 28, 2008, from <http://www.meritsprinkler.com/myths.htm>
- Milke, J. A. (2003, May). National residential fire sprinkler initiative. United States Fire Administration (pp. 1-22). Emmitsburg, MD: USFA.
- Mirkhah, A. (2007, February). Save lives & then some. Fire Chief, 38-42.
- municipal report. (n.d.). Home fire sprinkler coalition. [Municipal report]. Retrieved July 10, 2008, from HFSC website: <http://www.homefiresprinkler.org/FS/Scottsdale15.html>
- new national survey. (n.d.). New national survey shows a majority of homeowners believe that fire sprinklers increase a home's value: Builders who install fire

sprinklers as standard are seen as innovative and caring [Press Releases].

Home fire sprinkler coalition. Retrieved July 12, 2008, from Home Fire

Sprinkler Coalition website:

<http://www.homefiresprinkler.org/releases/HarrisPoll.html>

Nojiri, W. T. (2003, December). Should the City and County of Honolulu require a fire sprinkler system for the construction and reconstruction of any residential building? Emmitsburg, MD: National Fire Academy.

Notarianne, K. A., & Jackson, M. A. (1994, June). Comparison of fire sprinkler piping materials: Steel, copper, chlorinated polyvinyl chloride and polybutylene, in residential and light hazard installations. National Institute of Standards and Technology (pp. 1-40). U.S. Department of Commerce.

ordinances. (n.d.). Ordinances, bills, resolutions: How a bill becomes an ordinance.

In *Council and Council Services*. Retrieved July 31, 2008, from the City and County of Honolulu website: <http://www.honolulu.gov/council/ord.htm>

Pamplin, D. (2007, January/February). Common sense is not common. *Sprinkler Quarterly*, (pp. 21-22).

paradigm. (n.d.). In Webster's Revised Unabridged Dictionary. Retrieved

August 8, 2008, from Dictionary.com website:

<http://dictionary.reference.com/browse/paradigm>

residential sprinkler myths and facts. (n.d.). Residential sprinkler myths and facts:

The arguments against sprinklers. In United States Fire Administration, U.S., Department of Homeland Security. Retrieved May 26, 2008, from

https://www.usfa.dhs.gov/citizens/all_citizens/home_fire_prev/sprinklers/facts.shtm

Shannon, J. M. (2007, May/June). Attacking the fire problem. NFPA Journal.

Siarnicki, J. R. (2001, January). Residential sprinklers: One community's experience twelve years after mandatory implementation. *Executive Leadership Course* (pp. 1-46). Emmitsburg, MD: National emergency training center's (NETC) Learning Resource Center (LRC).

staff. (2001, August). Grand jury recommends fire sprinklers. Sprinkler Age Magazine, 21. Retrieved July 27, 2008, from Sprinkler Age Magazine website: <http://www.firesprinkler.org/sprinkleragesite/database.htm>

the U.S. (n.d.). The U.S. fire problem. In National Fire Protection Association website: Retrieved May 30, 2008, from <http://www.nfpa.org/itemDetail.asp?categoryID=953&itemID=23071&URL=Research%20&%20Reports/Fire%20statistics/The%20U.S.%20fire%20problem>

trade-up. (n.d.). Trade-ups Good for Developers, Homeowners and Communities. Home Fire Sprinkler Coalition. Retrieved July 20, 2008, from Home Fire Sprinkler Coalition website:

<http://www.homefiresprinkler.org/FS/FSTradeups.html>

Tremblay, K. J. (2004, January/February). FireWatch. NFPA Journal. Retrieved July 27, 2008, from NFPA Journal website:

<http://www.nfpa.org/publicColumn.asp?categoryID=&itemID=19683&src=NFPAJournal>

- Trotter, B. (2005). Defending new residential fire sprinkler markets. *Sprinkler Quarterly*, (Fall), 44-46.
- Wassman, C. (2005a, March). CFAI Standard of Response Coverage. Section 3: Response Time. Honolulu, HI: Honolulu Fire Department.
- Wassman, C. (2005b, March). CFAI Standard of Response Coverage. Section 6: Distribution. Honolulu, HI: Honolulu Fire Department.
- Wood, R. W. (2004, October). Barriers to implementing a residential sprinkler program in Nashua, NH. Leading community risk reduction. Emmitsburg, MD: National Emergency Training Center's (NETC) Learning Resource Center (LRC).
- word of mouth. (n.d.). Word of Mouth. In Wikipedia, the free encyclopedia. Retrieved July 9, 2008, from http://en.wikipedia.org/wiki/Word_of_mouth

Appendix A

(FC)
ORDINANCE NO. 83-58

BILL NO. 86 (1982)
(Draft No. 3)
*As Amended

A BILL FOR AN ORDINANCE TO AMEND CHAPTER 19A OF THE REVISED ORDINANCES OF HONOLULU 1978, AS AMENDED, ENTITLED "FIRE CODE OF THE CITY AND COUNTY OF HONOLULU" BY ADDING ARTICLE 2 THERETO.

BE IT ORDAINED by the People of the City and County of Honolulu:

SECTION 1. Chapter 19A of the Revised Ordinances of Honolulu 1978 is hereby amended by adding Article 2 to read as follows:

Article 2. Life Safety Requirements for Existing Hotel Buildings.

Sec. 19A-2.1. General.

- (a) Purpose. The purpose of this article is to provide for a reasonable degree of public safety by establishing minimum life safety requirements for existing hotel buildings.
- (b) Scope. The provisions of this article shall apply to every existing hotel building as defined in this article. A determination that an existing building is subject to the provisions of this article, shall be made by the Fire Chief. Said determination, if contested, shall be governed by Chapter 91 of the Hawaii Revised statutes.

Sec. 19A-2.2. Definitions.

For purposes of this article,

- (1) "Annunciator" shall mean a unit containing two or more identified targets or indicator lamps in which each target or lamp indicates the circuit, condition and location to be annunciated.

(OCS/110283/VB)
*CWR-62

83-58

83-58

- (2) "Building Code" shall mean the provisions of Chapter 16 of the Revised Ordinances 1978, which are in effect on the date of approval of this article.
- (3) "Existing hotel building" shall mean a hotel building erected prior to the date of approval of this article, or one for which a legal building permit has been issued.
- (4) "Guest" shall mean a person whose principal place of residence is other than the dwelling or lodging unit rented or hired out, or in instances involving time sharing units occupied, by the person for sleeping purposes.
- (5) "Guest Room" shall mean any dwelling or lodging unit intended or designed to be rented, or hired out to be occupied, for sleeping purposes by guests, and shall include units subject to the provisions of Chapter 514E of the Hawaii Revised Statutes (Time Sharing).
- (6) "Hotel" shall mean any building which has floors used for human occupancy located more than 75 feet above the highest grade and which contains dwelling and/or lodging units 50 percent or more of which are guest rooms. A hotel license issued pursuant to Section 445-92 of the Hawaii Revised Statutes shall be prima facie evidence that the building licensed is a hotel subject to the provisions of this article.

Sec. 19A-2.3. Requirements.

For hotels subject to the provisions of this article:

- (1) Automatic Sprinkler Systems. An automatic sprinkler system shall be provided throughout the entire hotel. The installation of the system shall be in conformance with the Building Code.

83-58

- (2) Smoke Detectors. Smoke detectors shall be provided in every guest room, interior exit corridor, mechanical equipment, electrical, transformer, telephone equipment, elevator machine or similar room. The installation of the smoke detectors shall be in conformance with the Building Code. Any smoke detector installed in an interior exit corridor shall be connected to an annunciator.
- (3) Corridor Doors. All doors opening into interior exit corridors shall be in conformance with the Building Code, except that 1-3/4 inch bonded, solid-core wood doors need not be replaced.
- (4) Exit Stairwell Doors. All stairwell doors, which are to be locked to prevent entry from the stairwell side, shall be automatically unlocked without unlatching when the fire alarm system activates or upon power failure.
- (5) Fire Alarm Systems. All fire alarm systems shall be designed to be heard clearly within all habitable areas of the hotel and shall be connected to an annunciator. The annunciator shall be located in the first floor lobby area or other area approved by the Fire Chief.
- (6) Emergency Power. Emergency power shall be provided for exit signs, exit illumination and fire alarm systems. Such emergency power shall be supplied by a generator, or an approved battery or other approved source of energy.
- (7) Emergency Plan. The management for each hotel shall establish and maintain a written fire and life safety emergency plan, which is to be approved by the Fire Chief. The Fire Chief shall develop written criteria and guidelines upon which all plans shall be based.

83-58

(8) Exiting Plans and Placards.

(A) Exiting plans. Exiting plans which are to be approved by the Fire Chief shall be posted on the room side of the entry door for each guest room.

(B) Placards. Placards with exit instructions for elevators and stairwells and other placards shall be posted in locations approved by the Fire Chief.

(9) Fire Drills. The management for each hotel subject to the provisions of this article shall conduct fire drills for staff and employees at least once every 180 days. A written record of each drill shall be maintained in the hotel management's office and made available to the fire department for review.

Sec. 19A-2.4. Permit Required.

A building permit shall be obtained whenever required by Chapter 18 of the Revised Ordinances 1978.

Sec. 19A-2.5. Compliance.

(a) Authority. The Fire Chief is authorized to require compliance with the provisions of this article.

(b) Examination and Furnishing of List to Owner or Operator. The Fire Chief shall examine each hotel subject to the provisions of this article. Upon the completion thereof, the Fire Chief shall immediately furnish to the owner or operator of the hotel a written list of items required to achieve compliance with this article.

(c) Compliance schedule.

(1) Sixty days. Each hotel shall comply with subsections (7), (8), and (9) of Section 19A-2.3 within sixty (60) days after the receipt of the written list.

83-58

(2) One Year. The owner or an authorized representative of each hotel shall submit plans to the Fire Chief showing intended methods of compliance with subsections (1) through (6) of Section 19A-2.3 within one (1) year after receipt of the written list.

(3) Five years. Each hotel shall comply with subsections (1) through (6) of Section 19A-2.3 within five (5) years after receipt of the written list.

(d) Deviation and Extension of Time. Deviations or extensions of time shall be allowed by the Fire Chief for good cause shown for a period not to exceed two (2) years.

Sec. 19A-2.6. Appeals.

Any appeal from the decision of the Fire Chief involving the denial of any deviation or extension of time may be submitted to the Board of Appeals as specified in the Building Code. The Board may grant a deviation or extension of time if it finds that the time period appealed from poses an undue hardship, provided the total time of compliance shall not exceed seven (7) years from the receipt of the written list of items as specified in Sec. 19A-2.5.

Sec. 19A-2.7. Severability.

If any section, subsection, paragraph, sentence, clause or phrase of this article is declared unconstitutional or invalid for any reason, such decision shall not affect the validity of the remaining portions of this article.

Sec. 19A-2.8. Rules and Regulations.

Subject to Chapter 91 of the Hawaii Revised Statutes, the Fire Chief shall promulgate rules and regulations having the force and effect of law for the implementation, administration, and enforcement of this article.

83-56

SECTION 2. New material is underscored. When revising, compiling or printing this ordinance for inclusion in the Revised Ordinances of Honolulu, the Corporation Counsel need not include the underscoring.

SECTION 3. The provisions of this ordinance shall take effect upon approval, except that for hotels subject to Chapter 514A of the Hawaii Revised Statutes (Horizontal Property Regime), the provisions of this ordinance shall take effect six months after the date of approval.

INTRODUCED BY:

William S. Farnett

COUNCILMEMBERS

DATE OF INTRODUCTION:

OCTOBER 13, 1982

Honolulu, Hawaii

APPROVED AS TO FORM AND LEGALITY:

X Xintan K. Q. Zhang
Deputy Corporation Counsel

Deputy Corporation Counsel

APPROVED this 18th day of

November, 1983.

Eileen R. Anderson
EILEEN R. ANDERSON, Mayor
City and County of Honolulu

City and County of Honolulu

Appendix B



CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

ORDINANCE 01 - 53

BILL 39 (2000), CD1, FD1

A BILL FOR AN ORDINANCE

RELATING TO FIRE SAFETY IN EXISTING BUSINESS BUILDINGS.

BE IT ORDAINED by the People of the City and County of Honolulu:

SECTION 1. The purpose of this ordinance is to address fire safety requirements for existing business buildings. More specifically, this ordinance requires existing business buildings to retrofit when necessary to comply with specified fire safety standards.

SECTION 2. Chapter 20, Article 2, Revised Ordinances of Honolulu 1990, is amended by amending its title to read as follows:

**"Article 2. Life Safety Requirements for
Existing Hotel Buildings and Existing Business Buildings"**

SECTION 3. Section 20-2.1, Revised Ordinances of Honolulu 1990, is amended to read as follows:

"Sec. 20-2.1 General.

- (a) Purpose. The purpose of this article is to provide for a reasonable degree of public safety by establishing minimum life safety requirements for existing hotel buildings[,] and existing business buildings.
- (b) Scope. The provisions of this article shall apply to every existing hotel building and every existing business building as defined in this article. A determination that an existing building is "an existing business building" subject to [the provisions of] this article[,] shall be made by the fire chief. [Such determination, if contested, shall be governed by HRS Chapter 91.] Any appeal from the decision of the fire chief may be submitted to the board of appeals for hearing and determination as provided in Chapter 16."



CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

ORDINANCE 01-53

BILL 39 (2000), CD1, FD1

SECTION 4. Section 20-2.2 ("Definitions"), Revised Ordinances of Honolulu 1990, is amended as follows:

1. By adding new definitions of "building official," "business building," and "existing business building" to be appropriately inserted and to read:

"Building official" means the same as defined under Section 16-1.1."

"Business building" means a building to which both of the following apply:

- (1) At least 50 percent of the building is classified as "group B -- business" occupancy by the building official pursuant to the building code; and
- (2) Has floors used for human occupancy located more than 75 feet above the lowest level of fire department vehicle access."

"Existing business building" means a business building erected before the effective date of Ordinance 01-__ or one for which a legal building permit has been issued before that date."

2. By amending the definition of "building code" to read:

"Building code" means:

- (1) With respect to an existing hotel building, the provisions of Chapter 16[, ROH 1990,] which [are] were in effect on the date of approval of [this article.] Ordinance 83-58; and
- (2) With respect to an existing business building, the provisions of Chapter 16 which are in effect on the effective date of Ordinance 01-__."



CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

ORDINANCE 01-53

BILL 39 (2000), CD1, FD1

3. By amending the definition of "existing hotel building" to read:

"Existing hotel building" means a hotel building erected prior to the date of approval of [this article,] Ordinance 83-58 or one for which a legal building permit [has been] was issued[.] before that date."

SECTION 5. Section 20-2.3 ("Requirements"), Revised Ordinances of Honolulu 1990, is amended by amending its title to read as follows:

"Sec. 20-2.3 Requirements[.]~~Hotels.~~"

SECTION 6. Chapter 20, Article 2, Revised Ordinances of Honolulu 1990, is amended by adding a new section to be designated and to read as follows:

"Sec. 20-2.3A Requirements-Existing business buildings.

For an existing business building:

- (a) Automatic sprinkler system. An automatic sprinkler system shall be provided throughout the entire existing business building. The installation of the system shall be in accordance with the building code.
- (b) Smoke detectors. Smoke detectors shall be provided in every mechanical equipment, electrical, transformer, telephone equipment, elevator machine or similar room and in elevator lobbies. The installation of the smoke detectors shall be in accordance with the building code. Smoke detectors shall be connected to an automatic fire alarm system installed in accordance with the fire code.
- (c) Corridor doors. All doors opening into interior exit corridors shall be in accordance with the building code;



CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

ORDINANCE 01 - 53

BILL 39 (2000), CD1, FD1

except that 1 3/4-inch bonded, solid-core wood doors need not be replaced.

- (d) Exit stairwell doors. All stairwell doors, which are to be locked to prevent entry from the stairwell side, shall be automatically unlocked without unlatching when the fire alarm system activates or upon power failure.
- (e) Fire alarm systems. When actuated, fire alarm-initiating devices shall activate an alarm signal which is audible throughout the existing business building or in designated portions of the building when approved by the fire chief. The alarm signal shall be a distinctive sound, which is not used for any purpose other than the fire alarm. Fire alarm-initiating devices shall be connected to an annunciator panel which panel shall be located in the first floor lobby area or other area approved by the fire chief.
- (f) Emergency power. Emergency power shall be provided for exit signs, exit illuminations, and fire alarm systems. Such emergency power shall be supplied by a generator or an approved battery or other approved source of energy.
- (g) Emergency plan. The management or owner of each existing business building shall establish and maintain a written fire and life safety emergency plan, which is to be reviewed by the fire chief and which shall be updated annually. The fire chief shall develop written criteria and guidelines upon which all plans shall be based.
- (h) Exiting plans and placards.

 - (1) Exiting plans. Exiting plans which are to be reviewed by the fire chief shall be posted on each floor at each elevator lobby.



CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

ORDINANCE 01-53

BILL 39 (2000), CD1, FD1

(2) Placards. Placards with exit instructions for elevators and stairwells and other placards shall be posted in locations approved by the fire chief.

(i) Fire drills. The management or owner of each existing business building shall conduct fire drills for staff and employees at least once every 180 days. A written record of each drill shall be maintained in the management office of the building and made available to the fire chief for review."

SECTION 7. Section 20-2.5 ("Compliance"), Revised Ordinances of Honolulu 1990, is amended by amending subsections (b) and (c) to read as follows:

"(b) Examination and Furnishing of List to Owner or Operator. The fire chief shall examine each hotel and existing business building subject to [the provisions of] this article. Upon the completion thereof the fire chief shall immediately furnish to the owner or operator of the hotel or existing business building a written list of items required to achieve compliance with this article.

(c) Compliance Schedule.

(1) Sixty Days. Each hotel or existing business building shall comply with subsections (g), (h), and (i) of Section 20-2.3 or 20-2.3A, as applicable, within 60 days after the receipt of the written list.

(2) One Year. The owner or an authorized representative of each hotel or existing business building shall submit plans to the fire chief showing intended methods of compliance with subsections (a) through (f) of Section 20-2.3 or 20-2.3A, as applicable, within one year after receipt of the written list.



CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

ORDINANCE 01 - 53

BILL 39 (2000), CD1, FD1

- (3) Five Years. Each hotel or existing business building shall comply with subsections (a) through (f) of Section 20-2.3 or 20-2.3A, as applicable, within five years after receipt of the written list."

SECTION 8. The council intends that this Ordinance shall not affect the application of Chapter 20, Article 2, Revised Ordinances of Honolulu 1990, on existing hotel buildings as defined under that Article.

SECTION 9. Ordinance material to be repealed is bracketed. New ordinance material is underscored. When revising, compiling, or printing this ordinance for inclusion in the Revised Ordinances of Honolulu, the revisor of ordinances need not include the brackets, the bracketed material, or the underscoring.



CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII

ORDINANCE 01-53

BILL 39 (2000), CD1, FD1

SECTION 10. This ordinance shall take effect on January 1, 2002.

INTRODUCED BY:

Jon Yoshimura

Andy Mirikitani

DATE OF INTRODUCTION:

April 7, 2000
Honolulu, Hawaii

Councilmembers

APPROVED AS TO FORM AND LEGALITY:

James A. Howell
Deputy Corporation Counsel

APPROVED this 1st day of November, 2001.

Jeremy Harris
JEREMY HARRIS, Mayor
City and County of Honolulu

(OCS/101501/ct)

-7-

01-53

CITY COUNCIL
CITY AND COUNTY OF HONOLULU
HONOLULU, HAWAII
CERTIFICATE

ORDINANCE **01-53**BILL 39 (2000)


INTRODUCTION DATE: APRIL 7, 2000

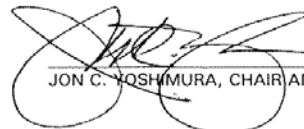
INTRODUCED BY: CHAIR JON YOSHIMURA

| | AYE | NO | A/E |
|---|--------------|----------|----------|
| 1ST READING DATE: 4/26/00 REMARKS: Mirikitani/Mansho - Bill passed 1st reading and referred to Planning and Public Safety. - 9. | BAINUM | X | |
| | DeSOTO | X | |
| | FELIX | X | |
| | HANNEMANN | X | |
| | HOLMES | X | |
| | KIM | X | |
| | MANSHO | X | |
| | MIRIKITANI | X | |
| | YOSHIMURA | X | |
| | TOTAL | 9 | 0 |
| 2ND READING DATE: 9/11/01 DRAFT: CD1 COMMITTEE REPORT: PPSCR-333 PUBLIC HEARING DATE: 9/11/01 REMARKS: 7/11/01 - PPSCR-333 adopted/Recommend passage on 2nd reading, as amended to CD1 form, and scheduling of a public hearing for 9/26/01 Council meeting. 9/11/01 - Felix/DeSoto - Bill passed 2nd reading, as amended. - 8. Excused: Okino. - 1. Public hearing held concurrently, closed and referred to Planning and Public Safety. | BAINUM | X | |
| | CACHOLA | X | |
| | DeSOTO | X | |
| | FELIX | X | |
| | HOLMES | X | |
| | MANSHO | X | |
| | MIRIKITANI | X | |
| | OKINO | | E |
| | YOSHIMURA | X | |
| | TOTAL | 8 | 1 |
| 3RD READING DATE: 10/17/01 DRAFT: CD1, FD1 COMMITTEE REPORT: PPSCR-431 REMARKS: Felix/DeSoto - PPSCR 431 be adopted and Bill pass 3rd reading. Felix/DeSoto - Bill amended to FD1. - 9. No objections from 9 members present, so ordered by Chair that the Council Rule relating to the 48-hour notice be waived. PPSCR-431 adopted and Bill passed 3rd reading, as amended (CD1, FD1). - 9. | BAINUM | X | |
| | CACHOLA | X | |
| | DeSOTO | X | |
| | FELIX | X | |
| | HOLMES | X | |
| | MANSHO | X | |
| | MIRIKITANI | X | |
| | OKINO | X | |
| | YOSHIMURA | X | |
| | TOTAL | 9 | 0 |

Referred to: PLANNING AND PUBLIC SAFETY
Reference:

I hereby certify that the above is a true record of action by the Council of the City and County of Honolulu on this BILL.


ROXANNE VAGAY, ACTING CITY CLERK


JON C. YOSHIMURA, CHAIR AND PRESIDING OFFICER

01-53

Appendix C

Building Fire Analysis by Occupancy**Date Range: From 1/1/2003 To 12/31/2003**

| Causes | No. Fires | Loss Bldg | Loss Contents | Loss Total | Est Value Structure | Death | | Injury | |
|--|-----------|-------------|---------------|-------------|---------------------|-------|-----|--------|-----|
| | | | | | | FF | CIV | FF | CIV |
| <u>Occupancy - 1 or 2 family dwelling - 419</u> | | | | | | | | | |
| Unintentional | 83 | \$2,045,920 | \$450,710 | \$2,496,630 | \$5,516,500 | | | | 7 |
| Failure of equipment or heat source | 25 | \$1,112,700 | \$250,050 | \$1,362,750 | \$1,995,500 | | | 1 | 3 |
| Intentional | 19 | \$736,500 | \$51,100 | \$787,600 | \$1,361,500 | | | 1 | 1 |
| Cause under investigation | 11 | \$1,045,500 | \$175,000 | \$1,220,500 | \$1,045,500 | | 1 | | |
| Cause undetermined after investigation | 5 | \$285,700 | \$57,620 | \$343,320 | \$785,200 | | | | |
| No Description | 1 | \$500 | \$400 | \$900 | \$500 | | | | |
| Sub Total : | 138 | \$5,226,820 | \$984,880 | \$6,211,700 | \$10,704,700 | | 1 | 2 | 11 |
| <u>Occupancy - 24-hour care Nursing homes, 4 or more persons - 311</u> | | | | | | | | | |
| Failure of equipment or heat source | 1 | | \$150 | \$150 | \$2,500,000 | | | | |
| Unintentional | 1 | \$50 | \$50 | \$100 | \$50 | | | | |
| Sub Total : | 2 | \$50 | \$200 | \$250 | \$2,500,050 | | | | |
| <u>Occupancy - Ballroom, gymnasium - 121</u> | | | | | | | | | |
| Failure of equipment or heat source | 1 | | \$200 | \$200 | | | | | |
| Sub Total : | 1 | | \$200 | \$200 | | | | | |
| <u>Occupancy - Bar or nightclub - 162</u> | | | | | | | | | |
| Unintentional | 2 | \$1,000 | \$5,000 | \$6,000 | \$1,000 | | | | |
| Cause undetermined after investigation | 1 | | | | | | | | |
| Sub Total : | 3 | \$1,000 | \$5,000 | \$6,000 | \$1,000 | | | | |
| <u>Occupancy - Barracks, dormitory - 464</u> | | | | | | | | | |
| Intentional | 1 | | | | | | | | |
| Sub Total : | 1 | | | | | | | | |
| <u>Occupancy - Beach - 937</u> | | | | | | | | | |
| Intentional | 1 | \$60 | \$400 | \$460 | \$60 | | | | |
| Sub Total : | 1 | \$60 | \$400 | \$460 | \$60 | | | | |

Building Fire Analysis by Occupancy

Date Range: From 1/1/2004 To 12/31/2004

| Causes | No. Fires | Loss Bldg | Loss Contents | Loss Total | Est Value Structure | Death | | Injury | |
|--|-----------|-------------|---------------|-------------|---------------------|-------|-----|--------|-----|
| | | | | | | FF | CIV | FF | CIV |
| <u>Occupancy - 1 or 2 family dwelling - 419</u> | | | | | | | | | |
| Unintentional | 74 | \$1,689,765 | \$293,665 | \$1,983,430 | \$2,466,365 | | 3 | 1 | 4 |
| Failure of equipment or heat source | 25 | \$1,226,800 | \$302,900 | \$1,529,700 | \$1,820,600 | | 2 | | 5 |
| Intentional | 25 | \$1,885,300 | \$301,600 | \$2,186,900 | \$2,563,000 | | 3 | 1 | |
| Cause under investigation | 13 | \$1,006,000 | \$295,500 | \$1,301,500 | \$1,105,000 | | 1 | 1 | |
| Cause undetermined after investigation | 7 | \$227,300 | \$51,000 | \$278,300 | \$227,300 | | | | 2 |
| Cause, other | 1 | \$2,000 | | \$2,000 | \$2,000 | | | | |
| Sub Total : | 140 | \$6,037,165 | \$1,244,665 | \$7,281,830 | \$8,184,265 | | 9 | 3 | 11 |
| <u>Occupancy - 24-hour care Nursing homes, 4 or more persons - 311</u> | | | | | | | | | |
| Unintentional | 1 | | | | | | | | |
| Sub Total : | 1 | | | | | | | | |
| <u>Occupancy - Adult education center, college classroom - 241</u> | | | | | | | | | |
| Intentional | 2 | \$5,500 | \$100 | \$5,600 | \$5,500 | | | | |
| Sub Total : | 2 | \$5,500 | \$100 | \$5,600 | \$5,500 | | | | |
| <u>Occupancy - Amusement center: indoor/outdoor - 129</u> | | | | | | | | | |
| Unintentional | 1 | | | | | | | | |
| Sub Total : | 1 | | | | | | | | |
| <u>Occupancy - Ballroom, gymnasium - 121</u> | | | | | | | | | |
| Unintentional | 1 | | | | | | | | |
| Sub Total : | 1 | | | | | | | | |
| <u>Occupancy - Bar or nightclub - 162</u> | | | | | | | | | |
| Failure of equipment or heat source | 2 | \$500 | | \$500 | \$500 | | | | 1 |
| Unintentional | 3 | \$80,025 | \$20,000 | \$100,025 | \$80,025 | | | | |
| Sub Total : | 5 | \$80,525 | \$20,000 | \$100,525 | \$80,525 | | | | 1 |
| <u>Occupancy - Barracks, dormitory - 464</u> | | | | | | | | | |
| Intentional | 1 | \$500 | | \$500 | \$500 | | | | |
| Sub Total : | 1 | \$500 | | \$500 | \$500 | | | | |

Building Fire Analysis by OccupancyDate Range: From 1/1/2005 To 12/31/2005

| Causes | No. Fires | Loss Bldg | Loss | Loss Total | Est Value Structure | Death | | Injury | |
|--|-----------|-------------|-------------|-------------|------------------------|-------|-----|--------|-----|
| | | | Contents | | | FF | CIV | FF | CIV |
| <u>Occupancy - 1 or 2 family dwelling - 419</u> | | | | | | | | | |
| Unintentional | 62 | \$2,239,600 | \$581,075 | \$2,820,675 | \$4,536,500 | | | 2 | 4 |
| Intentional | 19 | \$1,470,150 | \$183,500 | \$1,653,650 | \$1,861,250 | | | 3 | 1 |
| Failure of equipment or heat source | 22 | \$422,150 | \$134,475 | \$556,625 | \$1,149,650 | | | | |
| Cause undetermined after investigation | 19 | \$1,137,300 | \$273,500 | \$1,410,800 | \$1,212,300 | | 1 | | |
| Cause under investigation | 10 | \$585,050 | \$176,000 | \$761,050 | \$640,050 | | 2 | | 1 |
| No Description | 2 | \$10,000 | \$1,400 | \$11,400 | \$450,000 | | | | |
| Sub Total : | 131 | \$5,864,250 | \$1,349,950 | \$7,214,200 | \$9,849,750 | | 3 | 5 | 6 |
| <u>Occupancy - Adult education center, college classroom - 241</u> | | | | | | | | | |
| Failure of equipment or heat source | 1 | | | | | | | | |
| Sub Total : | 1 | | | | | | | | |
| <u>Occupancy - Bar or nightclub - 162</u> | | | | | | | | | |
| Unintentional | 2 | \$22,000 | \$1,000 | \$23,000 | \$22,000 | | | | |
| Cause undetermined after investigation | 1 | | | | | | | | |
| Sub Total : | 3 | \$22,000 | \$1,000 | \$23,000 | \$22,000 | | | | |
| <u>Occupancy - Boarding/rooming house, residential hotels - 439</u> | | | | | | | | | |
| Unintentional | 4 | | \$3,300 | \$3,300 | \$200,000 | | | | |
| Failure of equipment or heat source | 2 | \$140,200 | \$10,250 | \$150,450 | \$220,000 | | | | |
| Cause undetermined after investigation | 1 | | | | | | | | |
| Intentional | 1 | \$10,000 | \$200 | \$10,200 | \$15,000 | | | | |
| Sub Total : | 8 | \$150,200 | \$13,750 | \$163,950 | \$435,000 | | | | |
| <u>Occupancy - Business office - 599</u> | | | | | | | | | |
| Intentional | 3 | \$100,550 | \$150 | \$100,700 | \$5,100,050 | | | | |
| Unintentional | 2 | \$8,000 | \$7,000 | \$15,000 | \$8,000 | | | | |
| Cause undetermined after investigation | 1 | | | | | | | | |
| Sub Total : | 6 | \$108,550 | \$7,150 | \$115,700 | \$5,108,050 | | | | |

Building Fire Analysis by OccupancyDate Range: From 1/1/2006 To 12/31/2006

| Causes | No. Fires | Loss Bldg | Loss Contents | Loss Total | Est Value Structure | Death | | Injury | |
|---|-----------|-------------|---------------|-------------|---------------------|-------|-----|--------|-----|
| | | | | | | FF | CIV | FF | CIV |
| <u>Occupancy - 1 or 2 family dwelling - 419</u> | | | | | | | | | |
| Unintentional | 64 | \$3,054,700 | \$518,485 | \$3,573,185 | 21,237,200 | | 2 | 4 | 9 |
| Failure of equipment or heat source | 18 | \$790,750 | \$147,723 | \$938,473 | \$9,330,750 | | 1 | | 4 |
| Cause undetermined after investigation | 13 | \$503,700 | \$145,550 | \$649,250 | \$1,253,700 | | | 1 | |
| Intentional | 12 | \$864,000 | \$273,270 | \$1,137,270 | \$1,992,000 | | | | 2 |
| Cause under investigation | 10 | \$1,495,700 | \$130,400 | \$1,626,100 | \$5,800,000 | | | 1 | 1 |
| No Description | 1 | \$60,000 | | \$60,000 | \$6,500,000 | | | | |
| Sub Total : | 117 | \$6,768,850 | \$1,215,428 | \$7,984,278 | \$46,113,650 | | 3 | 6 | 16 |
| <u>Occupancy - 24-hour care Nursing homes, 4 or more persons - 311</u> | | | | | | | | | |
| Cause undetermined after investigation | 1 | \$300 | | \$300 | \$300 | | | | |
| Sub Total : | 1 | \$300 | | \$300 | \$300 | | | | |
| <u>Occupancy - Bank - 592</u> | | | | | | | | | |
| Unintentional | 1 | | | | | | | | |
| Sub Total : | 1 | | | | | | | | |
| <u>Occupancy - Bar or nightclub - 162</u> | | | | | | | | | |
| Unintentional | 3 | \$500 | \$500 | \$1,000 | \$500,000 | | | | 2 |
| Cause undetermined after investigation | 1 | \$20,000 | \$15,000 | \$35,000 | \$20,000 | | | | |
| Failure of equipment or heat source | 1 | | | | | | | | |
| Sub Total : | 5 | \$20,500 | \$15,500 | \$36,000 | \$520,000 | | | | 2 |
| <u>Occupancy - Barracks, dormitory - 464</u> | | | | | | | | | |
| Intentional | 1 | | | | | | | | |
| Sub Total : | 1 | | | | | | | | |
| <u>Occupancy - Boarding/rooming house, residential hotels - 439</u> | | | | | | | | | |
| Cause undetermined after investigation | 3 | \$500 | | \$500 | \$500 | | | | |
| Failure of equipment or heat source | 3 | \$1,100 | \$1,200 | \$2,300 | \$2,001,100 | | | | |
| Unintentional | 2 | \$2,500 | | \$2,500 | \$360,000 | | | | |
| Cause under investigation | 1 | \$10,000 | \$20,000 | \$30,000 | \$10,000 | | | | |
| Sub Total : | 9 | \$14,100 | \$21,200 | \$35,300 | \$2,371,600 | | | | |

Building Fire Analysis by Occupancy

Date Range: From 1/1/2007 To 12/31/2007

| Causes | No. Fires | Loss Bldg | Loss Contents | Loss Total | Est Value Structure | Death | | Injury | |
|---|-----------|-------------|---------------|--------------|---------------------|-------|-----|--------|-----|
| | | | | | | FF | CIV | FF | CIV |
| <u>Occupancy - 1 or 2 family dwelling - 419</u> | | | | | | | | | |
| Unintentional | 128 | \$3,712,735 | \$577,070 | \$4,289,805 | 24,260,410 | | 2 | | 13 |
| Failure of equipment or heat source | 20 | \$1,187,200 | \$345,700 | \$1,532,900 | \$4,839,850 | | | | 6 |
| Cause undetermined after investigation | 19 | \$2,395,900 | \$550,030 | \$2,945,930 | \$4,618,000 | | | | |
| Cause, other | 7 | \$595,000 | \$68,000 | \$663,000 | \$1,195,000 | | | | |
| Cause under investigation | 6 | \$355,000 | \$52,000 | \$407,000 | \$725,000 | | | | |
| Intentional | 6 | \$345,000 | \$22,000 | \$367,000 | \$1,095,000 | | | | |
| No Description | 1 | | | | | | | | |
| Sub Total : | 181 | \$8,590,835 | \$1,614,800 | \$10,205,635 | \$36,733,260 | | 2 | | 19 |
| <u>Occupancy - 24-hour care Nursing homes, 4 or more persons - 311</u> | | | | | | | | | |
| Unintentional | 1 | \$20 | | \$20 | \$1,200,000 | | | | |
| Sub Total : | 1 | \$20 | | \$20 | \$1,200,000 | | | | |
| <u>Occupancy - Adult education center, college classroom - 241</u> | | | | | | | | | |
| Cause undetermined after investigation | 1 | \$100,000 | \$250,000 | \$350,000 | \$100,000 | | | | |
| Unintentional | 1 | | \$3,000 | \$3,000 | \$2,500,000 | | | | |
| Sub Total : | 2 | \$100,000 | \$253,000 | \$353,000 | \$2,600,000 | | | | |
| <u>Occupancy - Amusement center: indoor/outdoor - 129</u> | | | | | | | | | |
| Intentional | 1 | | | | | | | | |
| Sub Total : | 1 | | | | | | | | |
| <u>Occupancy - Bar or nightclub - 162</u> | | | | | | | | | |
| Unintentional | 3 | \$11,500 | \$2,000 | \$13,500 | \$11,500 | | | | |
| Sub Total : | 3 | \$11,500 | \$2,000 | \$13,500 | \$11,500 | | | | |
| <u>Occupancy - Boarding/rooming house, residential hotels - 439</u> | | | | | | | | | |
| Unintentional | 7 | \$36,075 | \$2,475 | \$38,550 | \$706,075 | | | | |
| Cause undetermined after investigation | 1 | | | | | | | | |
| Failure of equipment or heat source | 1 | \$5,000 | \$500 | \$5,500 | \$5,000 | | | | |
| Intentional | 1 | \$200 | \$800 | \$1,000 | \$250,000 | | | | |
| Sub Total : | 10 | \$41,275 | \$3,775 | \$45,050 | \$961,075 | | | | |

Appendix D

**HONOLULU FIRE DEPARTMENT**

Kenneth G. Silva, Fire Chief

Alvin K. Tomita, Deputy Fire Chief

POWERS, DUTIES, AND FUNCTIONS

The City Charter of the City and County of Honolulu designates the Honolulu Fire Department (HFD) as the fire protection agency for the City and County of Honolulu. The HFD's responsibilities are to provide fire fighting, rescue, emergency medical and hazardous materials (hazmat) response for the entire island of Oahu, which is an area of 604 square miles. These duties are performed in a wide variety of terrain that include steep mountain ranges, wild lands, and agricultural fields; structures which comprise a modern metropolitan city, including industrial complexes, business centers, government complexes, high-rise resorts, condominiums, and high-density urban residential dwellings; and the ocean surrounding the island.

The fire chief and the deputy fire chief manage the operation and administration of the HFD and are responsible for carrying out the following functions mandated by the City Charter:

- Fire fighting and rescue work in order to save lives and property from fires and emergencies emanating from hazardous terrain, ocean rescues, and hazmat.
- Training, equipping, maintaining, and supervising fire fighters and rescue personnel.
- Monitoring the construction and occupancy standards of buildings for the purpose of fire prevention.
- Providing educational programs related to fire prevention.
- Performing other duties as may be required by law.

ORGANIZATION

The HFD consists of 1,092 uniformed personnel and 55 civilians totaling 1,147 employees. Personnel are organized into four divisions: Fire Operations, Administrative Services Bureau, Support Services, and Planning and Development (P&D). Each division is managed by an Assistant Chief (AC) who is responsible for the daily management of the division and provides executive support to the fire chief and deputy fire chief.

The department maintains a modern and technologically advanced force of fire-fighting and rescue personnel and equipment through its various activities administered by qualified professional leadership. The department continues to develop and conduct various programs such as reliable and efficient communication systems, fire apparatus maintenance and repair, training and research, and a coordinated city radio system. The fire prevention program, which includes inspections, investigations and enforcement of fire regulations, and a fire safety education program, continues to expand and grow with the latest trends and national standards of the fire service.

HONOLULU FIRE COMMISSION

The five fire commissioners are: Cynthia M. Bond, Sandra Au Fong, William "Buzzy" Hong, Jacob Ng, and Michael Yamaguchi. In September 2005, Elizabeth Ho replaced Cynthia M. Bond. In January 2006, Sylvia Waiwaiole-Hopfe replaced Sandra Au Fong.

The commissioners, assisted by a part-time secretary and an attorney from the Department of the Corporation Counsel, meet monthly with the fire chief, the deputy fire chief, and/or members of the fire chief's executive staff (ACs). The commission has accomplished the following:

- Reviewed the HFD's Executive Report for 2005, which consisted of the fire chief's vision and a statement of the HFD's goals and objectives.
- Established a blue-ribbon panel and the process in which to select the new fire chief.
- Selected the new fire chief.
- Addressed five public complaints and requests for information involving the HFD.
- Developed the Honolulu Fire Commission's budget for Fiscal Year (FY) 2006 and reviewed the HFD's budget for FY 2006-07.
- Attended various departmental and promotional ceremonies.

OFFICE OF THE FIRE CHIEF

Executive leadership, management, and strategic planning are the responsibilities of the fire chief and deputy fire chief. The Office of the Fire Chief is supported by two secretaries.